The Newspaper of Information Systems Management
December 26, 1994/January 2, 1995, Vol. 29, No. 1, 124 Pages, $6/Copy, $48/Year

COMPUTERWORLD

FORECAST 1995



Between the information superhighway, IS restructuring, client/server technology and the remote computing explosion, 1994 was a crazy year. But hang on to your seats. Our annual Forecast issue, beginning on page 15, looks at how far we've come in the past 12 months and spells out what IS can expect in the new year.

Big iron reawakens

By Craig Stedman

One of the dreams of the client/server revolution was that off-loading application processing from host systems to PC networks would allow users to reduce their dependence on mainframes.

Well, dream on.

It turns out that client/server systems do little to rein in mainframe workloads. So say information systems executives at several companies that continue to store corporate data on IBM System/390 mainframes as they head down the off-loading path.

"People are worrying about having to buy a new mainframe just to handle batch processing. They don't know how to explain that to their management."
— Charlie Burns, Gartner Group

PC drain

Spreading powerful and user-friendly PCs around a company and letting them access mainframe databases can increase demands on big iron, the IS officials said. With PCs pulling down much greater amounts of data than terminals ever could, mainframes have more than enough work to keep them busy, even if their host processing role has been diminished, they explained.

"Dumb terminals can fit maybe 1,500 or 2,000 characters on a screen, but a [PC] can ask for half of a database, so the mainframe activity that it can generate is pretty significant," said Doug Underhill, a technical specialist in the IS unit at CSX Corp., a railroad company in Richmond, Va.

CSX has started implementing

Big iron, *page 7*

Merry Switchmas, users!

Internetworking rivals battle to win accounts

By Laura DiDio and Stephen P. Klett Jr.

Score one for internetworking users, who are finding lots of cheer this holiday season.

Companies in the midst of upgrading to next-generation hubs and routers are watching with glee as vendors fight for their business with promises of equipment buybacks, extended or free service and support, and deep discounts on capital equipment purchases.

"It's clear now that users are starting to react either positively or negatively to the merger," said Eric Hindin, an analyst at Strategic Network Consulting in Rockland, Mass. He was referring to the 5-month-old merger of SynOptics Communications, Inc. and Wellfleet Communications, Inc. that created Bay Networks, Inc.

Merry Switchmas, *page 10*

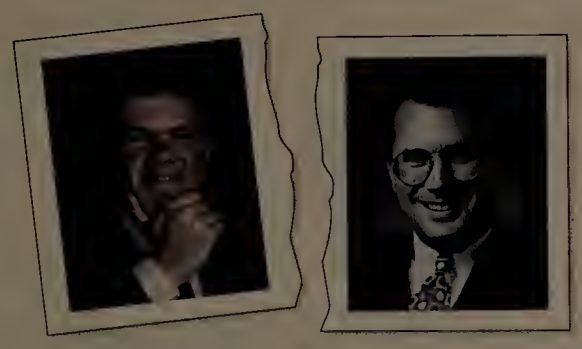
1993 combined hub/router market share
(Worldwide for U.S. vendors)
TOTAL MARKET: $4.15B

Bay Networks	21.5%
Cisco	20%
Cabletron	14.5%
3Com	7%
Digital	6%
Hewlett-Packard	6%
IBM	5%
Chipcom	4%
Other	16%

Source: The Yankee Group, Boston

Borland's Maib resigns

By William Brandel



CEO Philippe Kahn *(left) and* former COO Keith Maib

One week after emphatically denying he would even consider abandoning Borland International, Inc. in its darkest hour, Keith Maib, chief operating officer, quit. His resignation took effect Dec. 22.

Dismayed Wall Street analysts said Maib, who was brought in from Price Waterhouse eight months ago, was Borland's best and probably last hope to turn its operations around. Without Maib, there is little confidence in Borland's ability to rejuvenate its performance, they said.

Analysts speculated that Chief Executive Officer Philippe Kahn was back in charge after winning a struggle with Maib to control op-

Borland, *page 121*

Newspaper

Pentium policy recalculated

Cyberspace wake-up call

By Ellis Booker

News, good and bad, travels fast in cyberspace.

Weeks before the daily papers or Wall Street got wind of the calculation error in Intel Corp.'s Pentium chip, the flap over it was gaining momentum in the on-line community. Particularly damning were the jokes, replicated across thousands of electronic-mail accounts, ridiculing the Pentium and its creators.



Marketing experts say Intel's painful experience at the fingertips of on-line critics should serve as a wake-up call to corporate America. Information and rumors flow with equal abundance and speed in cyberspace, and companies that fail to monitor and respond to such chatter do so at their peril.

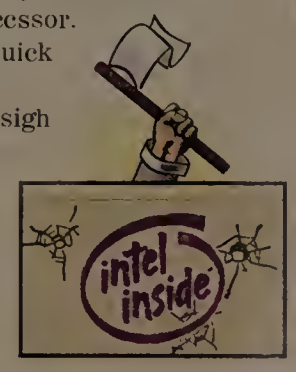
Harley Hahn, author of the *Internet Yellow Pages* and the *Internet Complete Reference*,

Cyberspace, *page 121*

New chips — no questions

By Jaikumar Vijayan

Finally capitulating to extensive pressure, a chastised Intel Corp. used the waning weeks of December to announce a no-questions-asked chip replacement policy for its flawed Pentium processor. But don't expect a quick correction.



An almost palpable sigh of relief rippled across the Internet, where many users had savaged Intel's initial response to the chip flaw. However, analysts gave some credit for Intel's change of heart to PC suppliers, many of which had already instituted similar policies and thus pressured Intel to do the same.

Yet most customers can expect to wait several weeks or even months to get their replacements as vendors, service providers and Intel itself work out the logistics of a potentially mas-

New chips, *page 121*

A PUBLICATION OF IDG

What's Inside

December 26, 1994/
January 2, 1995

NEWS

■ Companies **off-loading application processing** from host systems to PC networks are discovering that it is not doing much to reduce their dependence on mainframes, which are still facing increased workloads due to heavy requests for data from PC users. *Page 1*

■ **Internetworking users** are holding all the cards as the rivalry of Bay Networks, Cabletron and Cisco heats up. Users are now wielding their power to leverage better deals on service, support and pricing. Customers who are happy with their current vendors' equipment are standing firm and resisting pressure to switch. *Page 1*

■ Problems continue to plague the **LTE Elite** from Compaq, but most users consider them minor. *Page 4*

■ Users appear unconcerned with Microsoft's latest delay of **Windows 95**. *Page 4*

■ **Apple** stays in lockstep — and more — with Microsoft as it again delays its next-generation operating system in a move that could cost it corporate customers. *Page 6*

■ **Kiosks**, which mostly failed in the '80s, are regaining popularity in government, retailers and banks. But companies implementing them should not expect quick profits. *Page 8*

■ **Distributed Technologies** is supporting the Open Database Connectivity standard in its Pathtracker asset management application. This gives users a standards-based way to bring information about client/server hardware and software assets into a broad variety of leading databases. *Page 10*

COMPUTER INDUSTRY

■ Computer resellers, distributors and retailers maintain that **Pentium sales** have remained largely unaffected by the recent controversy, although the level of concern seems to have escalated. *Page 12*

■ Siemens/Nixdorf Informationssysteme AG is trying to import its **European server business** into the U.S., but analysts say it will not be easy to find a spot in an already-crowded market. *Page 12*

DESKTOP COMPUTING



■ In recent months, vendors have been long on promises for **desktop applications** coming out in 1995. But a closer look reveals there will be more evolution — not revolution — in 1995 products. *Page 72*

■ Despite the delay in the **Windows 95** ship date, users say they are looking forward to implementing the new operating system in 1995. Meanwhile, IBM's OS/2 doesn't have much of a chance to win the popularity contest. *Pages 72 and 73*

WORKGROUP COMPUTING

■ The 1995 **network operating system market** will be the scene of a fierce battle between Novell's NetWare 4.1 and Microsoft's NT Server 3.5. Because both companies have already introduced their big guns, analysts predict they will add enhancements and put most of their musele into out-marketing each other. *Page 77*

■ Integrated suites, workflow and perhaps some surprise punches are expected from **Computer Associates** in client/server applications next year. *Page 78*

■ Unix vendors are **building more connectivity** among their wares and machines running Microsoft operating environments. *Page 79*

ENTERPRISE NETWORKING

■ Threats to network and **computer security** will increase in 1995, but defenses are also improving. *Page 81*

■ Analysts expect 1995 to be a transition year in the **messaging market**, paving the way for big changes in 1996. *Page 81*

■ For vendors and users, 1994 was a turbulent year for **internetworking**. While next year should bring no new technology, keep those seat belts fastened because the bumpy ride will continue as the product plethora breeds confusion. *Page 82*

LARGE SYSTEMS

■ **IBM continues to work** on making its big iron and AS/400 systems more client/server-friendly. *Page 83*

APPLICATION DEVELOPMENT

■ The top goal of **database leaders** for the new year will be to provide good, graphical client/server development tools. *Page 89*

■ Users will not receive clear answers in the **client/server application** development market in 1995; more confusion is expected. *Page 89*

CAREERS

■ **Check that attitude!** In 1995, technical skills won't change much, but IS managers will look for staffers with business acumen and customer service mind-sets. *Page 92*

MARKETPLACE

■ **What's hot:** anything Internet-related. What's not: groupware, ATM. 1995's ins and outs according to Alan Radding. *Page 111*

Company Index ..... *Page 120*
Editorial/Letters to the editor ..... *Page 70*
How to contact Computerworld ..... *Page 122*



'Twas the night before crisis
and all through the house
Not a program was working,
not even a browse

The programmers were wrung out
too mindless to care
Knowing chances of cutover
hadn't a prayer

The users were nestled
all snug in their beds
While visions of inquiries
danced in their heads



When out in the lobby
there arose such a clatter
I sprang from my cubicle
to see what was the matter

When what to my wondering eyes
should appear
But a super programmer, oblivious
to fear
More rapid than eagles
the programs they came
And he whistled and shouted
and called them by name:

On Update! On Add! On Inquiry!
On Delete!
On Batch Jobs! On Query!
On Functions Complete!

His eyes were glazed over,
fingers nimble and lean
From weekends and nights
in front of the screen

A wink of his eye
and a twist of his head
Soon gave me to know
I had nothing to dread



He spoke not a word
but went straight to his work
Turning specs into code
then he turned with a jerk

And laying a finger on the
Enter key
The system came up and
worked perfectly

The updates updated; the deletes,
they deleted
The queries inquired; the closing
completed

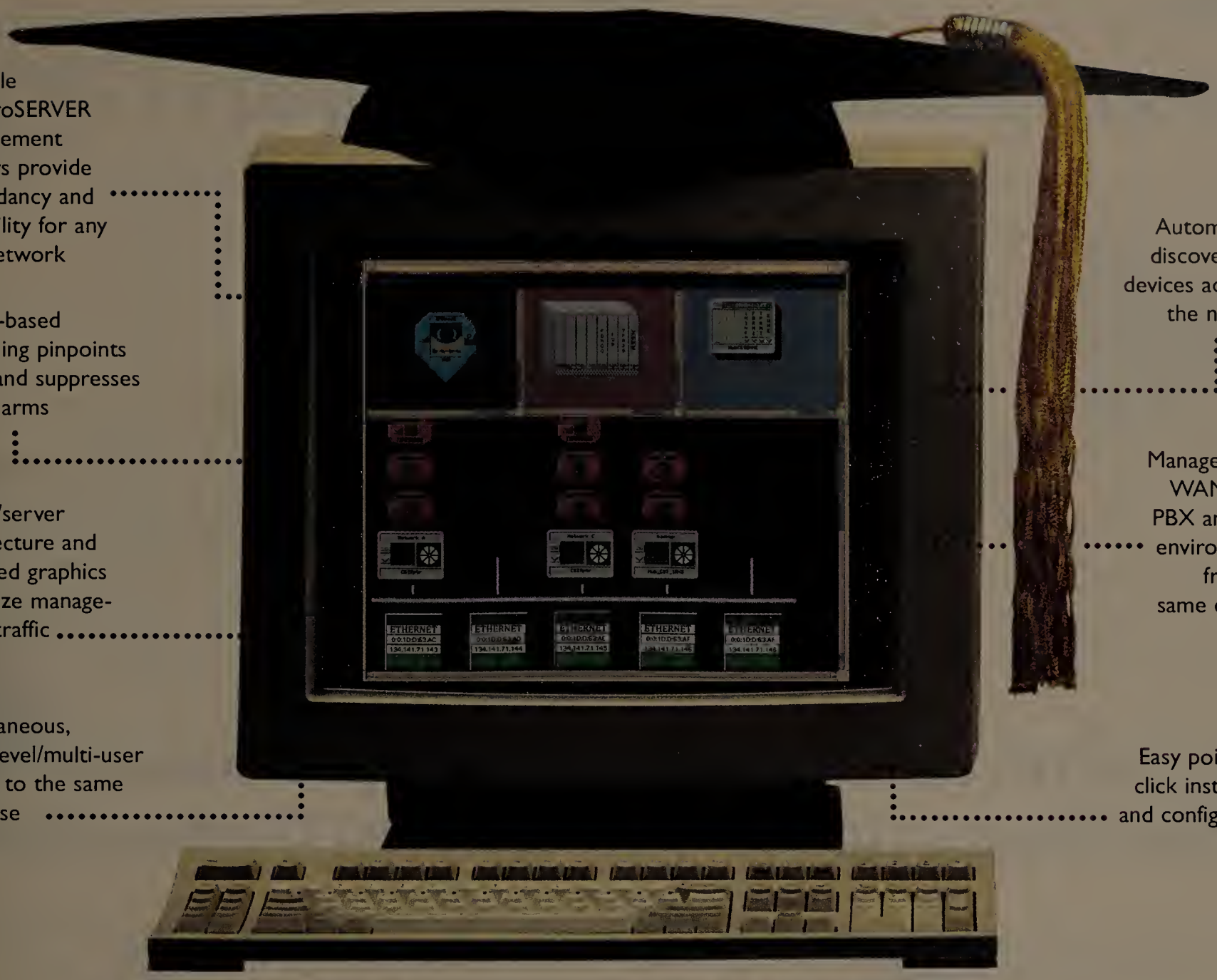
The system was finished,
the tests were concluded
The users' last changes
were even included



But the user exclaimed
with a snarl and a taunt
"It's just what I asked for,
but not what I want!"

–Anonymous Internet author

Lisa Blackshear



SPECTRUM®

The Management Platform with All the Answers.

Smart people the world over are finding the answers they need to solve their most daunting management problems with Cabletron's SPECTRUM 3.0, the industry's first intelligent enterprise management platform.

SPECTRUM saves you money by reducing downtime and automating many of your most common network management tasks. Its object-oriented design, case-based reasoning and inductive modeling abilities isolate faults and suppress false alarms to help you pinpoint problems before they adversely affect your network.

SPECTRUM's distributed client/server architecture offers unprecedented fault tolerance and saves you precious WAN bandwidth as you distribute management responsibilities throughout your organization. And its high level of integration with many industry-leading applications and third-party platforms makes it the most automated and scalable enterprise management system available.

Get the answers you need to manage your enterprise. Get SPECTRUM. For more information and a free demonstration, call Cabletron at (603) 337-2705.

CABLETRON SYSTEMS
The Complete Networking Solution™

Corporate Headquarters: 35 Industrial Way, Rochester, NH 03866-5005

Problems continue to bedevil Compaq's LTE Elite

By Jaikumar Vijayan

First it was a faulty read-only memory (ROM). Then it was a buggy PCMCIA controller. Now it is an errant built-in power supply.

Compaq Computer Corp.'s recent woes with its portable lines continue.

In a potentially embarrassing development, desktop leader Compaq acknowledged late last month that problems with a built-in 220V power supply had led to a product recall of its flagship LTE Elite notebooks from dealers in Europe. The problem does not affect U.S. users, but Compaq said it expects it will affect 10% of its users abroad.

"This is not good news for Compaq. It's another blow to their portable strategy," said Mike McGuire, an analyst at Dataquest, Inc. in San Jose, Calif. Even though the power supply problem may not be serious, the continuing series of minor but annoying flaws could undermine the Elite line, McGuire said.

According to Compaq, a problem with electric capacitors in the power supply could cause some Elites meant for the European markets to fail when plugged into certain European voltages. Only a "small number" of Elites have been shipped with the faulty power supply, a Compaq spokeswoman said.

> "Clearly this is something Compaq cannot afford with its portable products going forward."
>
> — Mike McGuire, analyst, Dataquest

However, Compaq said the power supply was not the primary reason for the recall. The reason, it appears, was an earlier problem with the machines.

"We are proactively replacing the power supplies. It is part of the ROM software upgrade we are currently carrying out in Europe as we did earlier in North America," a Compaq spokeswoman said.

She was referring to earlier problems with the Elites' system ROM, which prevented it from recognizing more than 16M bytes of RAM.

For units still with European dealers, the ROM upgrade and the power supply replacement will be done at Compaq's manufacturing facility in Erskine, Scotland. Technicians will be sent to user sites to replace the units in all other cases, Compaq said.

Inexpensive fix

"It doesn't appear to be a big deal," said Tim Bajarin, an analyst at Creative Strategies, Inc. in San Jose, Calif.

Fixing the problem is unlikely to cost Compaq much money, analysts said. The damage will be more in terms of customer perception of a product already known for problems — however minor, observers said.

"Clearly this is something Compaq cannot afford with its portable products going forward," McGuire said. Glitches such as these coupled with seriously delayed notebook product cycles may be hurting the company already. Recent figures from market researcher Dataquest show Compaq has slipped to a distant second place behind Toshiba America Information Systems, Inc., with which it was tied earlier.

Also, some said there may be more problems. For instance, one large Compaq customer in Miami, who is rolling out about 50 LTE Elites, said he received an advisory from Compaq alerting him to possible problems with network drivers on the SmartStation expansion unit in the LTE Elite. Others have complained of units that have shown up "dead on arrival" [CW, Oct. 17].

Discussion database market heats up for '95

By Suruchi Mohan

1995 will mark the emergence of discussion databases as part of the standard bag of messaging offerings from key vendors.

Analysts say the convergence of electronic mail, Internet activity and workgroup computing will drive this trend, which users view as a necessity.

Bulletin boards, often used synonymously with discussion databases, allow the posting of messages without crowding individual mailboxes.

"We sent out E-mail asking if people wanted [bulletin-board-type services], and the response was overwhelming," said Lisa Wilson, a computer analyst at Washington state's Department of Ecology in Olympia. "It will be as popular as E-mail," she noted.

Analysts said a large percentage of users already employ Notes for discussion purposes. "Notes can do bulletin-board features," said Tim Sloane, an analyst at Aberdeen Group in Boston. He said while such usage does not fully exploit Notes' capabilities, it often depends on how the product is initially used.

That is what Microsoft Corp. and Novell, Inc. had in mind when they entered partnerships with The Mesa Group and Collabra Software, Inc., respectively, to round out their product offerings and compete more aggressively with Notes.

Although every workgroup computing product is subjected to the Notes test, Michael Bragen, principal at Business Management Consulting in Lexington, Mass., said the Microsoft and Novell offerings address the low-end segment of the market that Notes has avoided.

This is the "first time developers of those products have said they will build their products on top of the messaging infrastructure," said Eric Arnum, editor of "Electronic Mail and Micro Systems."

True enough, agreed Patrick Whyte, manager of systems support at EG&G Energy Measurements, an engineering firm and large Novell GroupWise 4.1 site in Las Vegas. Whyte's firm had been using a DOS-based bulletin board that could not handle all the messages his users wanted to post. He bought Collabra Share in September and was happy when he heard about its alliance with Novell. Better integration between the two products would make life simpler, he said.

An important component of this trend is the Internet, which is rapidly gaining a stronger foothold in the user psyche. Sloane said the Internet is the wild card in the Lotus, Microsoft, Novell competition for an ever-larger share of the market. Internet providers, regional-access firms and content providers will bring new dimensions to the market, he said.

Netscape Communications Corp. is one such firm. It recently announced the Netscape Communications Server and Netscape Commerce Server, which let users exchange information and conduct commerce over the Internet using standards such as HyperText Markup Language and World-Wide Web protocols.

Netscape, however, is taking great pains to position itself only as an access point for the Internet. What differentiates it from discussion databases is that it is good for one-to-many communications but not for many-to-many, said Jeff Treuhaft, server product marketing manager at Netscape in Mountain View, Calif. The communication will become two-way by the end of 1995, but the Netscape line is not intended to compete with discussion databases, he said.

Users appear unconcerned with latest Windows 95 delay

By Stuart J. Johnston and Ed Scannell

Call it Windows 95 and three quarters — and if Microsoft Corp. has to move the release date of the next major upgrade of Windows again, they may have to rename it Windows 96, some users joked.

Although some users appeared a little impatient that Windows 95 will be delayed until August, most echoed the sentiments of John Berting, manager of software engineering at Rheometric Scientific, Inc. in Piscataway, N.J. Berting said he would rather see Microsoft get it right than on time.

He added that if Windows 95 elicits the level of demand that Microsoft has predicted — 30 million units in the first 12 months — "and if there's any kind of installation problem, it's going to blow up in their faces."



No hurry

Several users said their companies have no plans to upgrade immediately to the new system anyway. Instead, they will wait at least six months after delivery to make sure any final bugs are fixed. *Computerworld* reported in November that most corporate users plan to hold off initially, but many intend to upgrade at least half of their users by the end of the first year.

Brad Silverberg, senior vice president of Microsoft's Personal Operating Systems division, said on Dec. 20 that the company decided to add two months to the schedule because of feedback from the 48,000 users who have been beta-testing Windows 95 since early November. He said some installation problems and some hardware and software compatibility issues are the major holdup. "The job of installing smoothly on 60 million machines is a tough one," said Rogers Weed, Windows 95 group manager.

Microsoft said the two-month delay will be enough to fix existing problems and that no features would be added in the interim.

However, not everyone believes Microsoft's explanation about the delay.

"I think if they have any problem with the product at all it is with Exchange [the universal E-mail client] and [is] Microsoft Network-related," said Bill Mattox, a systems consultant at an international financial services corporation on the West Coast. The mail client "is a little slow, [and it] is not being done by the Windows 95 group [but rather] by the MS Mail group, and so it is really like trying to integrate some other vendor's product" into the operating system, he said.

Microsoft officials, however, flatly denied the delay has anything to do with either the Exchange client or the Microsoft Network, which is currently in beta testing. Support for the Microsoft Network is slated for Windows 95.

Similarly, independent software vendors said the delay will cause a slight headache but extends the market for their existing products.

"We expected that there would be a healthy 16-bit Windows market through 1995," said a spokesman from Lotus Development Corp. "This news reaffirms it; it doesn't negate that position."

Senior editor William Brandel contributed to this story.

There must be some reason why 30,000 CFOs use our software to keep track of these.

In fact, there are lots of reasons why Platinum financial software has been the first choice of so many companies for almost a decade. And Editor's Choice of *PC Magazine* again and again.

Not to mention the most popular client/server solution available today. So whether you need client/server financials for NetWare®, Windows NT®, or UNIX® platforms, there are more than 30,000 reasons to rely on us.

To hear the top ten, just call us at 1-800-414-7878.

PLATINUM®
The Financial Software Company™

© 1994 Platinum Software Corporation. All names and trademarks are properties of their respective c

Desktop systems

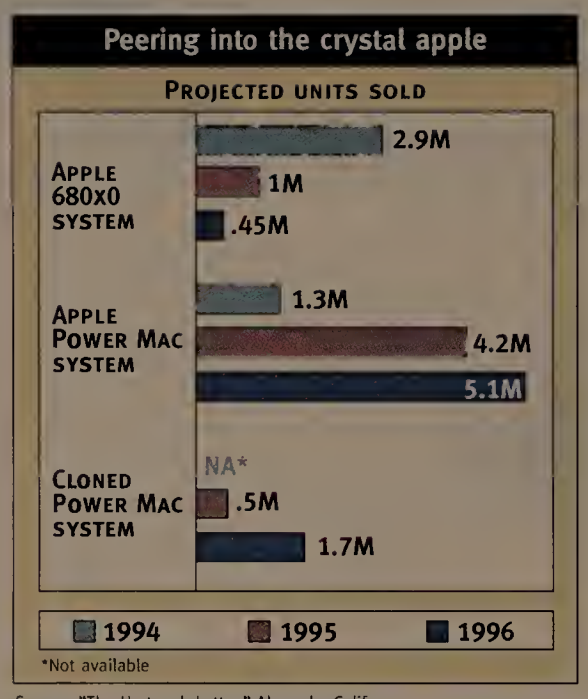
Apple strives to keep, gain users

By Mark Halper

For Apple Computer, Inc., 1995 poses the question of whether the company can maintain the momentum of its 10-month-old platform of the future: the Power Macintosh.

Many users and analysts say the answer lies partly in whether Apple will be able to woo desktop users from "WinTel" x86/Microsoft Corp. environments and partly in Apple's ability to find new customers.

Apple's ability to license its MacOS operating system and engender a Power Macintosh clone market will also be instrumental, as a clone market should spur software development that users said would also drive hardware sales.



Source: "The Hartsook Letter," Alameda, Calif.

Loyal users

Apple got off to a roaring start with its PowerPC-based systems in 1994. A spokesman said Apple sold more than 600,000 Power Macintoshes through September. The company said it expects to meet its long-stated goal of selling 1 million Power Macintoshes in its first 12 months. Some analysts said Apple has already hit that mark.

But virtually all of those sales have been to Apple's installed base of 680x0-based Macintosh users.

"Our research has shown that Apple customers have been very loyal in buying from Apple, but Apple has not been too successful in converting users over from WinTel," said Dan Ness, director of microsystems research at Computer Intelligence InfoCorp in La Jolla, Calif.

That is not to say Apple will soon run out of sales potential among its installed base. After all, San Jose, Calif.-based research firm Dataquest, Inc. noted that Apple sold 12.2 million 680x0-based Macintoshes between 1989 and 1993 — and many of those are still in circulation.

Causing a stir

But a wave of "WinTel" curiosity is running through that installed base as Apple users catch beta glimpses of Microsoft's forthcoming Windows 95 operating system. Delays in Apple's Mac OS are fueling that curiosity (see story above right). For one reason, Windows 95 is expected to include many of the friendly user interface features that have long distinguished Apple's system.

"There is a lot of pressure on IS departments to get Windows client/server tools," said Brian Comnes, an information center manager in the Apple shop at DHL Airways, Inc. in Redwood City, Calif. "If you look at the market, Windows has more client/server development tools than Macintosh."

Some Apple devotees are keeping the faith, however. Matt Ghourdjian, national director of technology at Los Angeles-based law firm Howrey & Simon, said he believes Apple's hardware introduction plans this year will lure users from the x86 architecture.

Apple is expected to provide substantial performance improvements in the Power Macintosh when it introduces desktop systems built on the next-generation PowerPC 604 chip. It is also incorporating the speedy Peripheral Component Interconnect bus as a replacement for Apple's NuBus.

Those machines, as well as PowerPC-based laptops, are expected to be introduced by midyear, but the 604 desktop systems may not be available until late 1995.

"The whole design [of the 604 systems] is industrial-strength," Ghourdjian noted. "I think this is where you'll see the gap widen between the PC world and the Mac."

Apple pushes Copland to '96

By Mark Halper

■ Microsoft Corp. is not alone in owning up to the latest in a series of next-generation operating system delays. Apple Computer, Inc. has quietly followed suit — a move that could cost it some corporate customers.

As users were preparing for holiday breaks, Apple confirmed "for anyone who asked" that it has pushed its target date for shipping its Copland operating system, also known as System 8, to mid-1996. A few weeks ago, Apple offered up a delivery date of the end of 1995 [CW, Dec. 5]. Copland was originally slated for a midyear 1995 arrival.

Apple is not knocking itself out to announce this latest delay. It does not plan to generally notify users, according to Copland product manager Vito Salvaggio, who said many users will learn about the new schedule from the media. Apple's sales subsidiaries will notify customers "as they see appropriate," he added.

Salvaggio attributed the delay to "the general complexity of the operating system." Integrating many features, such as Apple's Open Document document management system and Open Transport cross-environment data support, has been challenging, he said.

If Microsoft sticks to its own recently revised shipping schedule for Windows 95, the next version of Windows (see story page 4), it will have almost a year's head start in sales. Apple users are gaining interest in Windows 95 because it incorporates many of the user-friendly interface features that have long distinguished the Macintosh operating system.

"If Win95 does get released and Apple has nothing to show, it's going to be tough to come up with the business decision that Macintosh is the way to go," said Brandon Shults, director of store information systems at Trader Joe's Co. in South Pasadena, Calif. Almost all of Trader Joe's 130 or so desktops are aging 680x0-based Macintoshes, which the company will eventually replace with Power Macintoshes or Windows machines, he said.

Senior editor Kim Nash contributed to this story.

Chain reaction
The Copland delay has pushed back Apple's plans to ship Gershwin, the operating system that will follow Copland and provide full pre-emptive multitasking and an overhaul of the user interface. Vito Salvaggio, Copland product manager, said Gershwin will not be ready until at least 1997.

Power Macs to star at exposition

By Mark Halper
SAN FRANCISCO

Apple Computer, Inc. will take the product limelight at this week's Macworld show with the introduction of three Power Macintosh models that offer improved price/performance over existing models.

Apple will also introduce a $549 wireless device called Apple Mobile Message System. It enhances communications for Apple's PowerBook laptop computers, the Newton MessagePad personal digital assistant and Windows-based laptops.

MACWORLD EXPOSITION®

New apples on the tree

Model	6100/66	7100/80	8100/100
Speed	66 MHz	80 MHz	100 MHz
Cache	256K bytes	256K bytes	256K bytes
Storage	350M bytes	500M bytes	700M bytes
Price	$1,819	$2,899	$3,699

The three new Power Macintoshes (see chart) represent speed boosts and performance improvements of 20% to 40% over existing models. Apple is bumping its 60-MHz model 6100 to 66 MHz, the 66-MHz 7100 to 80 MHz and the 80-MHz 8100 to 100 MHz [CW, Nov. 7, 1994]. The company began ratcheting up Power Macintosh speeds in November when it added a 110-MHz model to the 8100 line.

Users said they were eager to put the new machines through their paces to discern actual performance improvements. Brandon Shults, director of store information systems at Trader Joe's Co. in South Pasadena, Calif., said he would be interested in benchmark results comparing the new Apple computers with PCs based on Intel Corp.'s Pentium chip.

Trader Joe's is predominantly an Apple shop but has yet to convert any of its 130 Macintoshes to Power Macintoshes. Shults cited a recent benchmark study published by *MacWorld* magazine that compared Apple's 110-MHz 8100 to a 90-MHz Pentium-based system; each platform won seven of the 14 categories. Shults said that result does little to convince him that the PowerPC-based Power Macintosh provides hands-down performance leadership.

Message away

Meanwhile, Apple said its new Mobile Message System will enable Apple users to receive and display long text messages. The PCMCIA-based device can also be programmed to automatically receive information updates for spreadsheets, calendars and other applications. But because it requires the MacOS operating system for many of its features, it will have limited capability on Windows laptops, an Apple spokeswoman said.

Mobile Message System attaches to a laptop or Newton through a PCMCIA slot and routes messages to MacOS's PowerTalk "universal mailbox." It includes a small LCD display for viewing short messages; longer messages are displayed on the Newton's or laptop's screen.

The device will require 8M bytes of RAM on an Apple laptop and 4M bytes on an x86-based laptop, Apple said.

Big iron

CONTINUED FROM PAGE 1

an OS/2-based geographic information system that tracks the status of freight trains as they travel on the railroad. It plans to move more tasks to PCs in the next 12 to 18 months, Underhill said. However, data will still be stored centrally, and early indications are that the consumption of mainframe processing cycles will continue to increase.

Reducing mainframe usage through off-loading "is probably only true if you don't ever expect [PCs] to come back and speak to it again," Underhill noted.

Above zero

The county of Santa Cruz in California has reduced its annual mainframe MIPS growth from more than 20% to about 15%, "but it doesn't look like it's going to go down to zero," said Luther Perry, information services director for the county. Usage of mainframe applications is still increasing, but the rigors of moving data between the mainframe and several new LAN-based applications is contributing to the workload increase, he added.

Even distributing data to smaller servers may not stem mainframe growth if batch processing is still done on a System/390. Charlie Burns, an analyst at Gartner Group, Inc. in Stamford, Conn., said he has seen cases where nightly batch workloads have shot up as much as 50% due to the strain put on the mainframe as it pulls the required data out of client/server systems.

"People are worrying about having to buy a new mainframe just to handle their batch processing," Burns said. "They don't know how to go and explain that to their management."

On average, large system shops plan to off-load about 10% of their processing from mainframes during 1995, according to a recent survey of 450 Gartner Group clients. During the same period, however, those companies expect to increase their mainframe capacity by 15%, said Mark Hess, another Gartner analyst.

In fact, the continuing need for more and more capacity is helping to fuel the overall mainframe resurgence that started in early 1994. After dropping in both 1992 and 1993, IBM's mainframe shipments were expected to shoot up 39% in 1994 to a record 160,000 MIPS, according to Annex Research in Phoenix. Annex forecast another 13% increase during 1995, to 180,000 MIPS.

The increased user productivity made possible by PCs "doesn't come for free," Burns said. "Most customers are looking at an increased [mainframe] workload no matter what they do."

"I haven't found that you off-load a whole lot," agreed Bill Neuser, director of capacity planning and support at Great Western Bank in Northridge, Calif. "The mainframe doesn't do it all now, but it still does more work."

Great Western installed LANs in its branch offices to process retail transactions locally, but all data is still uploaded to the mainframe and then made available for downloading on a companywide basis. "All we see is our back-office processors running a lot hotter than they used to," Neuser said. The bank plans to upgrade its System/390 in 1995.

An IS executive at a large Midwestern insurance company said his firm plans to start off-loading its electronic-mail and spreadsheet applications to LAN-based products in January. Mainframe usage may flatten out temporarily, but that is not expected to last, added the executive, who asked not to be identified.

"It's reasonable to assume that as users get comfortable with [PCs], they'll drive the mainframe harder and harder," he said. "We're not going to hold the line on mainframe growth. We'll just push it a few months down the road, when [upgrade] prices should be cheaper."

That may be the best customers can hope for. This is because some users and analysts project that the savings gleaned from deferring a mainframe upgrade may well be eclipsed by the cost of purchasing, implementing and running PC networks. "Client/server ain't saving anybody anything," Neuser said grimly.

Mainframes continue to experience renewed growth. See page 83.



FDR with **FASTCPK, FDRREORG, FDREPORT** and **ABR** are the proven resources most MVS users rely on. From the fury of Hurricane Andrew, surging Midwest floodwaters, World Trade Center bombing to the California earthquakes, Innovation product users were able to attain "business as usual" conditions faster and more completely than those using other products.

Two decades of experience and client confidence make Innovation systems the preferred disaster recovery system of DASD managers.

FDR/ABR provides the fastest backup and restore of entire volumes and individual data sets. ABR space management (ARCHIVING) can be used to move data to a less costly storage medium. Full support for RAMAC, ICEBERG, EMC DASD.

USER EXPERIENCES:

- "Incremental backup required 70% less elapsed time than DFHSM."
- "We merged data centers. The number of DASD volumes tripled. We switched to ABR and were able to complete the backups in the same amount of time."
- "The unthinkable occurred one day before our full volume backups. Within hours we were able to recover hundreds of DASD volumes at our disaster site from ABR incremental backups. ABR recovered the volumes as if we had done full backups the night before."

Find out why 5,000+ users rely on Innovation's FDR products to provide the best and least costly solution for their storage management needs.



Call for a FREE No-Obligation 90-Day Trial

For the Safest DASD Storage—It's critical you rely on...

Available for all MVS Operating Systems

INNOVATION® DATA PROCESSING

CORPORATE HEADQUARTERS: 275 Paterson Avenue, Little Falls, New Jersey 07424 • (201) 890-7300

EUROPEAN OFFICES: FRANCE 01-47-69-15-15 | GERMANY 089-439-2053 | NETHERLANDS 036-534-1660 | UNITED KINGDOM 0181-905-1266 | NORDIC COUNTRIES +31-36-534-1660

Multimedia

Kiosks head for fast track but profits slow

By Mary Brandel

You fly into an unfamiliar city. Before leaving the airport, you preview area restaurants, make reservations and print out a map with directions.

At a crowded bank, you bypass the line and use a touch screen and video link to speak with a teller.

If multimedia self-service kiosks succeed this time around, these types of capabilities will abound. In 1994, the number of kiosks in the U.S. totaled 70,000, according to Inteco Corp., a research firm in Norwalk, Conn. By 1997, they will increase to 359,000, said Tom Leonard, an analyst at Inteco.

USAir Group, Inc., JC Penney Co., Best-Buy Co., Ford Motor Co. and KeyCorp are just a few of the retail, public sector and financial institutions piloting or implementing kiosks.



The SoftAd Group *built a kiosk for General Eleetric Capital Co. as part of GE's program for house purchasers. The kiosk guides users through a primer on buying a house.*

But there has been plenty of kiosk roadkill between the late 1980s (when they were first tried and failed) and today. "The goals were wrong and reliability was poor, so most projects just ended," Leonard said.

Winning ways

While their customized nature will likely limit kiosks to niche markets, observers said they see many reasons for success today. These include lower prices, particularly through the use of CD-ROMs and off-the-shelf technology; better hardware reliability; easier authoring tools; interactive capabilities via multimedia; and the ability to analyze captured data.

Many firms choose systems integrators for implementation, but "there's no question that [kiosks pose] an opportunity for IS people who are willing to walk the marketing walk," said Alan Brody, president of Createch in Searsdale, N.Y.

But before you get kiosk-happy, be warned that not all of them are profitable. "Kiosks that try to sell products and services will never make money," Leonard said.

At Best-Buy, for example, "we're not providing information so we can sell you something," said Clark Becker, director of distributed processing at the discount consumer electronics retailer. The company recently implemented hundreds of kiosks in 21 stores. "It's a tool to figure out if what's on the shelf is what you need," he said.

For instance, a customer can see via full-motion video clips how much resolution they need on a new TV or if they need motion control on their camcorder.

Overnight data delivery

The ability to update data such as prices is something many older kiosks could not do. At Best-Buy, the corporate mainframe downloads new data each night to local Digital Equipment Corp. AlphaServer 2100s running Microsoft Corp. Windows NT in the stores.

A mistake many retailers make is letting programmers design the interface, Becker said. "They just walk you down a programmer's decision tree [and end with a question such as], 'Do you want an avocado or white refrigerator?'" he said.

Another mistake in older kiosks is that they tried to automate too much, said Michael Treacy, president of Treacy & Co. in Cambridge, Mass. "The most powerful part of multimedia in kiosks is that you can still interact with the person who's helping you," he said.

That is the approach at KeyCorp, a bank that is piloting kiosks at a number of branches. If users want to open an account or order checks, they press a button on the touch screen for a video connection to a teller.

Unlike Best-Buy, KeyCorp's bottom-line goal is to sell more products, with payback expected in three years. Banks are not building kiosks as quickly as the public or retail sectors, but the technology does make sense, Leonard said. Whereas a kiosk might cost $25,000 to build, a branch can cost $150,000 per year, Treacy estimated.

Another advantage of today's kiosks is the ability to collect consumer data. Ford Motor Co., for instance, may add a demographic survey to its kiosk to assist with target marketing, said Andre Holper, operations director at The SoftAd Group, a kiosk builder in Mill Valley, Calif.

News Shorts

First Mac clone is a done deal

After years of market anticipation, Apple Computer, Inc. has finally licensed its Macintosh operating system — to **Power Computing Corp.**, a small PC clone maker in Milpitas, Calif. Under the terms of the deal, Power Computing will serve as an OEM of logic boards and complete systems but will continue to market its own brand of computers. Company officials said they intend to market the MacOS-compatible systems at "very aggressive entry-level" prices through a variety of innovative design, manufacturing and distribution strategies. Company officials were not available at press time to comment on the details of those strategies. For years many industry observers have encouraged Apple to license its proprietary operating system in an attempt to gain market share among corporate accounts through price competition. The largest shareholder in Power Computing is Ing C. Olivetti & Co. No company officials could be reached last week to discuss Olivetti's plans for licensing the operating system. The company did say it plans to ship the Power PC-based systems running the Macintosh operating system in the spring.

Navigation Server ships

Sybase, Inc. released Navigation Server in late December, squeaking in under an end-of-1994 deadline for general shipment of the parallel processing database add-on product. Navigation Server had been delayed at least twice since it was announced in November 1992 while engineers at Sybase and development partner **AT&T Corp.** worked to improve speed and performance. The task for Sybase is to get Navigation Server working with the latest edition of its database, System 10. Now, it works only with the previous version, SQL Server 4.92.

Microsoft files copyright suit

Microsoft Corp. late last month filed a copyright infringement lawsuit against two resellers, **Evertek Computers** and **Kou-Tsui Ma**, claiming the companies illegally distributed Microsoft software at a trade show. The suit, filed in U.S. District Court for the Central District of California, represents Microsoft's ongoing efforts to "clean computer trade shows and swap meets of illegal hard disk loading and counterfeiting [of] Microsoft's products," a company spokesman said.

Client/server spending up

Client/server spending shot up 75% in 1994 from 1993, according to a recent survey from Dataquest, Inc. and Sentry Market Research. The survey, which included responses from 575 companies, found the average company dished out $12.3 million on client/server technology last year. Typically, a company spent 40% on hardware; the remaining 60% was split between software and services.

IBM Ramac arrays shipping



IBM said it is now shipping more than 200 of its Ramac mainframe disk arrays per week. Ramac production had been constrained because of a short supply of some parts used in the arrays, forcing IBM to schedule some deliveries later than customers had originally expected. While shipments are ramping up, the company said it will still take into the first quarter of 1995 to get completely up to date on orders. All told, IBM has shipped 1,000 Ramac subsystems, which support redundant arrays of inexpensive disks Level 5 technology.

Sabre president moves on

Sabre Decision Technologies President Thomas M. Cook is leaving his post to become a special decision-support systems consultant to **AMR Corp.** Chairman Robert Randall. Terrell B. Jones, currently president of Sabre Computer Services, has been named to fill Cook's post.



IBM claims Warp is hot

IBM on Dec. 21 announced it has sold more than 800,000 copies of OS/2 Warp worldwide. According to company officials, that figure does not include sales to the Japanese and Chinese markets, where OS/2 2.x has previously sold well. The company is expected to release the Full Pack version of OS/2 by the end of January.

Microsoft tries broadband

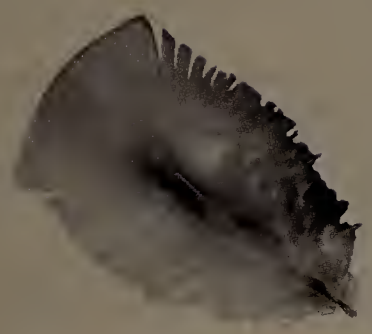
Although it will not have a single subscriber before Windows 95 ships, **Microsoft**'s on-line information network is already positioning for its next phase: broadband access. On Dec. 21, cable giant **Tele-Communications, Inc.** in Englewood, Colo., took a 20% stake in The Microsoft Network for $125 million in stock. TCI officials described the company's role as that of an investor in Microsoft's on-line venture rather than that of a development partner.

ILLUSTRATIONS BY JOHN BECK

Free Video: Avalon & IBM

Manufacturing Distribution & Financials





Just nine minutes with our free video — *Avalon and IBM: Reengineering With Client/Server Technology* — and you'll see why Avalon's time-based solutions are helping so many ordinary systems professionals become extraordinarily successful. Not only did IBM's RS/6000-based Austin systems keep the sub-second response time of their old mainframe-based MRP system, but with no additional floor space their three-week manufacturing cycle shrunk to two days.



Become a nine-minute genius. Call today.

800-AVALON1 (800-282-5661)
From Outside the United States Call 602-512-2000
FAX 602-512-2010

AVALON
SOFTWARE

Have Time Machine. Will Travel.

©1994 by Avalon Software. TRBA

RS/6000 is a trademark of IBM.

Added support for Pathtracker enhances ODBC

By Steve Moore

With Distributed Teehnologies Corp.'s recent announeement of Open Database Connectivity (ODBC) support for its Pathtracker asset discovery and management application, users now have a standards-based way to bring information about client/server hardware and software into a variety of leading databases.

An ODBC-compliant systems management application such as Pathtracker ean be used to select any ODBC-compliant database as a repository for systems data.

"We were looking for something ODBC-compliant because we've been burned before on produets that use their own proprietary databases," said Gary Wallace, MIS manager at Chevron Corp. in Port Arthur, Texas, and a Pathtracker user. Chevron uses the produet's autodiscovery capabilities to collect systems information remotely without sending a technician to manually inventory each machine, he said.

"Distributed Teehnologies is very early on support for the most popular de facto standard that allows asset-traeking middleware to aet as a translator between any particular desktop client and lots of different databases," said Brad Day, director of client/server computing research at Dataquest, Inc. in Framingham, Mass. He noted that leading database providers, including Oracle Corp. and Sybase, Inc., support ODBC.

"This lets the user have some comfort that ODBC really is the standard that people are going to start gravitating to," said Cheryl Currid, president of Currid & Co., a Houston consultancy. "ODBC has the potential to be the next SQL — the one that people standardize on."

Across the universe

ODBC support makes it easier for companies to move applications from PC-oriented databases to larger Unix-based databases as their end-user populations grow, said Riek Houpt, marketing direetor at Distributed Technologies in Waltham, Mass. Another advantage of ODBC is that a user switching from one database to another does not need new binaries or driver software, he added.

"One vulnerability of the ODBC standard is that its architecture is eontrolled by Microsoft," Day noted. Independent software vendors "that design to it are possibly given less of a vote in terms of how the specification is revised or changed."

Another issue is one of openness vs. performance, eautioned Bill Larson, president of MeAfee Associates, Ine., whose LANInventory produet competes with Pathtraeker. "Users want the benefits of openness, but will they take those benefits at the cost of a performance hit?" he asked.

ODBC-compliant produets do not perform as well as proprietary products that are optimized for use with a partieular database, Larson said. But for users who are interested, McAfee's LANInventory will be available with ODBC support in early 1995, he said.

Merry Switchmas

CONTINUED FROM PAGE 1

With the stakes so high, there is almost nothing Bay Networks, Cabletron Systems, Inc. and Cisco Systems, Inc. will not do — including jumping out of planes (see story below) — to keep or win users.

"Cabletron replaced $250,000 worth of SynOptics equipment for next to nothing to win my business," said Rick Graham, director of systems integration and planning at Lahey Clinic in Burlington, Mass. The clinic also negotiated training for support personnel at "reduced or at no extra cost," Graham said.

> **"Cabletron is more aggressive.... They're the Energizer Bunnies of the internetworking industry."**
> — John McVicar, Network analyst

"Cabletron is more aggressive and opportunistic than its rivals," said John McVicar, a network specialist at a leading Boston medical center. "They're the Energizer Bunnies of the internetworking industry,"

Can't win 'em all

Still, Tullet & Tokyo, Forex, Inc. switched from Cabletron to SynOptics this summer because it felt it was not getting enough service and support, said Len Monteleone, a vice president at the New York firm. "Once [Cabletron] got us, they became very complacent," Monteleone said.

Barbara Maaskant, director of information services at Emory School of Public Health in Atlanta, opted for a combined Cabletron/Cisco offering because of superior service and support.

"I've never had such conscientious attention from vendors," she said. "Cabletron called me every day and attended to every possible detail."

Mark Shahan, LAN administrator at the state of California's Department of Toxic Substances Control in Sacramento, said he was bound to go with the lowest priced equipment in the state-run store. In this case, it was Bay Networks' bid.

"I got a kick out of the way they were all fighting over me," Shahan said. "Cabletron was much more aggressive, and we would have gone with them were it not for price."

Yet some satisfied customers refused to be swayed, merger or no merger.

One such customer was Household International in Northbrook, Ill., which switched from Cabletron hubs to SynOptics. "We felt SynOptics could handle everything better," said Timothy Portokalis, manager of business systems.

Cabletron offered sister company Household Credit Services 65% on equipment buybacks to switch vendors, but the company declined.

As a longtime Wellfleet shop, Household International would like to see some improvements, however. "Support from Wellfleet has been inversely proportional to their volume of sales. They are experiencing some growing pains. They've been jerking us around with ship dates," Portokalis said.

Conversely, Jeff Jeffers, director of network services at Boston College in Newton, Mass., said the university, a SynOptics shop, is switching to Cabletron because of 20% cheaper hub prices and some support issues. In addition, the service and support costs are about half what Bay Networks offered. He said he is also leery of Bay Networks because of the merger.

New Year's dissolution

Bay Networks and Cabletron Systems will ring in the New Year in the midst of a contract squabble concerning Cabletron's right to sell and support routers from Wellfleet Communications.

Bay Networks told *Computerworld* it will not renew its three-year reseller contract with Cabletron, which ends Feb. 1, because it "was not making any effort to sell Wellfleet routers."

Cabletron confirmed that the contract would not be renewed.

"It was totally Wellfleet's decision. We would have been open to the idea of continuing to resell their equipment since we do have joint accounts," said Craig Benson, chairman of Cabletron. "The only one who gets hurt by this is the customer."

Bay Networks downplayed the effect of the contract lapse, however.

"Even resellers whose contracts are terminated can still have support contracts for their installed base, and we may do that for Cabletron," said Gary Bowen, vice president of marketing and field operations at Bay Networks. "Most large customers are already dealing directly with Wellfleet for support, though."

— Stephen P. Klett Jr. and Laura DiDio

Falling down on the job

The old adage, "You say jump, and I'll ask how high," came true — literally — for one Cabletron sales manager who leaped from a plane at an altitude of 9,000 feet to oust rival Bay Networks from a user account.

The prize for the successful skydive was a hefty one: Greg Mayhew, Cabletron's regional sales manager for the Silicon Valley region, won a $250,000 contract from Strategic Mapping, Inc. in Santa Clara, Calif.



Cabletron's Greg Mayhew *(bottom), pictured with his jump instructor, went to new heights to land a deal with Strategic Mapping*

The idea for the stunt began during a casual luneh between Mayhew and Alan Saylor, a former senior network systems administrator at Strategie Mapping.

For months, Mayhew religiously repeated Cabletron's credo of "doing whatever it takes to win business" to no avail. Finally, Saylor told Mayhew what it would take to win Strategic Mapping's business.

"I've always wanted to go skydiving, but I never had anyone to go with me," Saylor said.

"You got it," Mayhew replied. "Buy Cabletron MMAC hubs, and I'll pay for the both of us to go skydiving."

A week later Saylor called Mayhew and said he would sign the purchase order for Cabletron hubs with integrated Cisco routing and network management modules right after the two went skydiving.

"I was scared to death the entire time and even left a note for my parents in case I went splat and didn't make it," Mayhew said. "But scared or not, there was no way I was going to blow the deal." *— Laura DiDio*

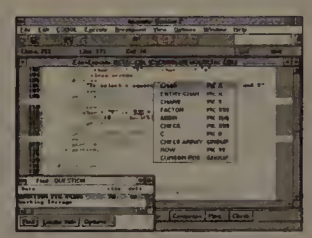


The Workbench® Graphical User Interface

How can a graphical interface help you master your programming environment?

It's all a matter of control… and Micro Focus COBOL Workbench® has a new graphical user interface that gives it to you.

Start with a programming environment you configure to accommodate the way you work. Quickly perform tasks through customized pull-downs and context sensitive menus in native Windows™ or OS/2® environments. Open a debugging session by simply dragging your project onto the debugging icon. Now you're in a visual programming environment where you can edit, compile and debug in a single window. Workbench even uses colorized syntax for quick identification of sections, verbs, data items, and typing errors. That's the kind of control that makes COBOL Workbench more responsive and you more productive.



The Workbench COBOL environment is fully compatible with OS/2 and Windows.

See for yourself. Contact Micro Focus at 800 M? COBOL Ext. 1201 and ask for your copy of the Micro Focus Interactive CD. On it, you'll find descriptions and interactive demonstrations of Micro Focus Application Development Tools.





There's a lot more to it. MICRO FOCUS®

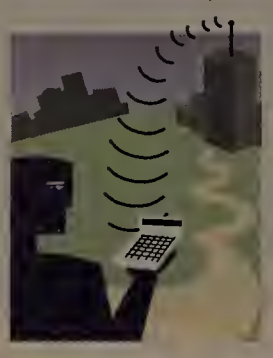
Micro Focus and COBOL Workbench are registered trademarks of Micro Focus Ltd. Other trademarks and registered trademarks are property of their respective companies.

Restraint governs wireless bidding

By Michael Fitzgerald
WASHINGTON

Gold rush or fool's errand? Bidders in the broadband personal communications services (PCS) wireless auctions said they will practice restraint rather than fall victim to the bidding madness that marked earlier spectrum auctions.

"We're not going to get caught in an irrational bidding war," said M. C. Patrick, a regulatory manager at Pacific Bell Mobile Services, a Pacific Telesis unit that wants PCS licenses in the California regions of Los Angeles/San Diego and San Francisco/San Jose/Oakland.



Indeed, the need for restraints was not evident during early bidding, which kicked off Dec. 5. Two of the 99 licenses for sale in the 51 regions were held by bids of $1,000 after the 12th round was completed, and one of the two licenses in Pittsburgh, a Top 25 market, was held for $410,277. Bidding for all the licenses totaled $956.8 million after the 12th round was completed Dec. 15.

"I don't think the PCS auctions are going to go as high as some thought," said Iain Gillott, an analyst at Link Resources Corp. in Framingham, Mass. Gillott said the billion-dollar prices expected for licenses in New York and Los Angeles did not appear realistic in light of the incremental pace of bidding.

Big score

Still, observers said they expect the Federal Communications Commission to take in several billion dollars when the bidding is complete in early 1995. And vendor sources said they planned to start out conservatively in the open-ended bidding format.

The FCC created PCS to lower costs and bring more features to wireless voice and data markets. The FCC decided to auction off the bandwidth after its experience with creating the cellular market, where licenses for use of the public airwaves were given away via a lottery. Bidding remains open on all licenses until all bids are cast.

Under the FCC's staged bidding structure, the current stage — Stage II — requires vendors to bid on two-thirds of the MHz/percent of the populace they have declared interest in to remain eligible for the auctions.

If bidding remains slow, it could arrest vendor concerns about the potential for expensive licenses, as well as the cost of building the new networks. It may also indicate that PCS will not be the low-cost technology the government envisions.

FCC officials said recently that the actual price of PCS licenses will not matter because multiple vendors are looking to build national wireless networks by combining PCS and cellular licenses as opposed to the duopolies in today's cellular voice and data markets. The auction will "introduce competition in a robust, vigorous way to the wireless communications industry," said FCC Chairman Reed Hundt.

Several vendors said if they do not win licenses in hotly contested areas such as Los Angeles, they would look to alternative strategies to build networks. These could include partnering with winners or targeting smaller chunks of the broadband spectrum that the FCC will auction off in 1995.

Meanwhile, government officials reveled in the beginning of the auctions, which were termed "the biggest sell-off of federal property ever" and a "gold rush."

Sales belie Pentium ills

By Jaikumar Vijayan

For a flawed chip caught in a public relations nightmare, the Pentium processor seems to be doing pretty well.

As the messy controversy over the floating-point flaw begins to simmer down, the market is holding fairly optimistic for Intel Corp.: Pentium sales have so far remained unaffected during the busiest selling season of the year.

Though actual figures are not yet available, anecdotal evidence collected by market research firms indicates that 1994 U.S. Pentium sales will meet analysts' projections of 2½ million to 3 million chips.

A random survey of about 20 large computer retailers around the country conducted by ARS, Inc., a market research firm in Irving, Texas, revealed that overall, the Pentium accounted for 42% of all computer sales during the week of Dec. 19. Pentium-based systems accounted for more than 45% of all the computers sold that same week by the 11 major superstores surveyed.

Interestingly, these figures are significantly higher than the Pentium sales reported by similar stores just before the flaw was revealed.

ARS cautioned that the estimates were based on retailers' perception of sales and focused only on the consumer and small-business markets. So far these segments have accounted for 60% to 70% of all Pentium sales. Actual sales figures for the quarter are not expected until the end of January at the earliest.

"The numbers may be slightly inflated" by the respondents, conceded Phil Magney, president of ARS. Corporate demand could be slowed a bit with concern over the flaw, he added.

The irony of defeat

IBM's decision to temporarily suspend Pentium shipments last week — and the relentless firestorm of negative publicity — has sharply escalated the levels of corporate concern, observers said.

"It has slowed down a few projects; it has created confusion and a lot of activity in the market, but it has not dampened sales," said Tom Taylor, executive vice president of Entex Information Services in New York, a leading reseller to corporate clients.

Ironically, corporate America's slow acceptance of the Pentium could substantially restrict the negative fallout, analysts said. Because most large corporations have few Pentium-based systems anyway, the flaw is likely to cause postponement of orders [CW, Dec. 5] rather than any great shift away from the processor, industry observers said.

In fact, since the flaw was publicized, most major systems vendors, resellers and distributors have steadfastly maintained that the controversy has not dampened demand for the product, especially in the consumer and small-office markets.

Siemens Nixdorf eyes crowded field

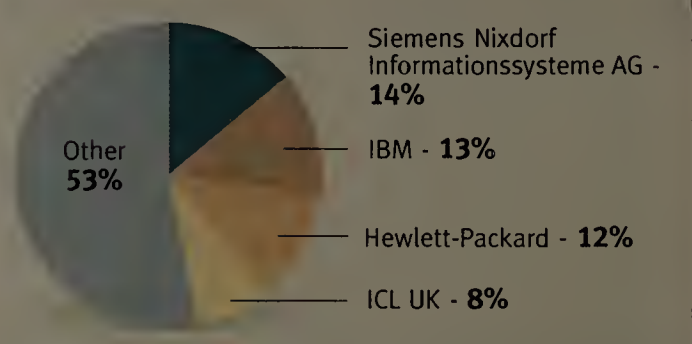
By Craig Stedman

Does the U.S. market need another Unix server vendor? Siemens Nixdorf Informationssysteme AG thinks so, but analysts said it will not be easy for the German company to import its successful European server business into the crowded U.S. marketplace.

Siemens Nixdorf, which started marketing its RM server line here this fall, is not an unknown quantity. It led the European midrange Unix pack in both revenue and unit shipments during 1993 (see chart), according to International Data Corp. in Framingham, Mass. Parent company Siemens AG is one of the world's largest technology vendors with revenue of $54.6 billion in its fiscal year ended in September.

Over there

1993 Western European market share by revenue for midrange Unix systems priced between $100,000 and $1 million



Source: International Data Corp., Framingham, Mass.

The former Nixdorf Computer even played a bit part in the U.S. proprietary systems market before Siemens bought it in 1990. But the company gave up on the U.S. after that deal, and industry watchers said it will have to give users some very compelling reasons to move from entrenched platforms.

That may not be easy. In a commodity market, it is "kind of tough to say" just what Siemens Nixdorf can bring to the table that is not already available, said Nancy Stewart, an analyst at Dataquest, Inc. in San Jose, Calif. "It's going to be an uphill battle," she said.

Lew Brentano, a vice president at Alliance Development, Inc., a consultancy in Phoenix, said Siemens Nixdorf needs to build up support from resellers and software vendors to become more credible in the U.S.

"I'd like to be real positive and say there's a huge opportunity for them, but it might be three or four years too late," Brentano said. To have a big presence, Siemens Nixdorf has to "find some way to go out and knock a couple of second-tier players out of the market."

Joseph Maguire, vice president of the server division at Siemens Nixdorf's U.S. subsidiary in Burlington, Mass., acknowledged that securing a sinecure here will be a challenge. "We're starting from scratch," he said.

Rather than emphasize technology, Maguire said he hopes to use Siemens' size and name recognition to attract customers concerned with placing their server bets on vendors with uncertain futures. He added that Siemens Nixdorf has a sales goal of just $10 million for the current fiscal year, most of which is expected to come from other Siemens units or European companies with U.S. subsidiaries.

Only ReportSmith Gives You . . .

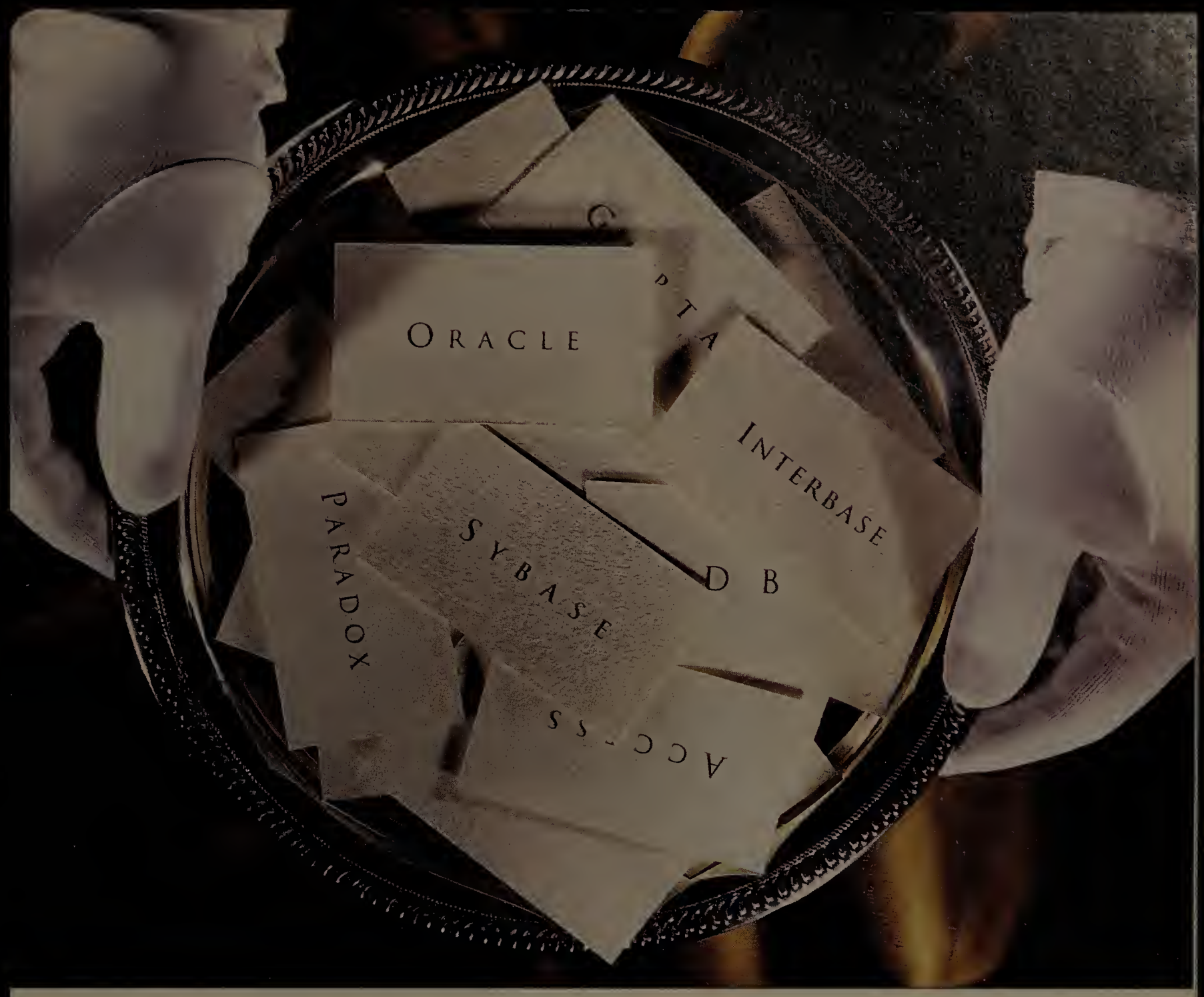
WYSIWYG reports from "live" data

Seamless database connectivity

Reports from any size database

Advanced crosstab analysis

Free runtime for easy distribution

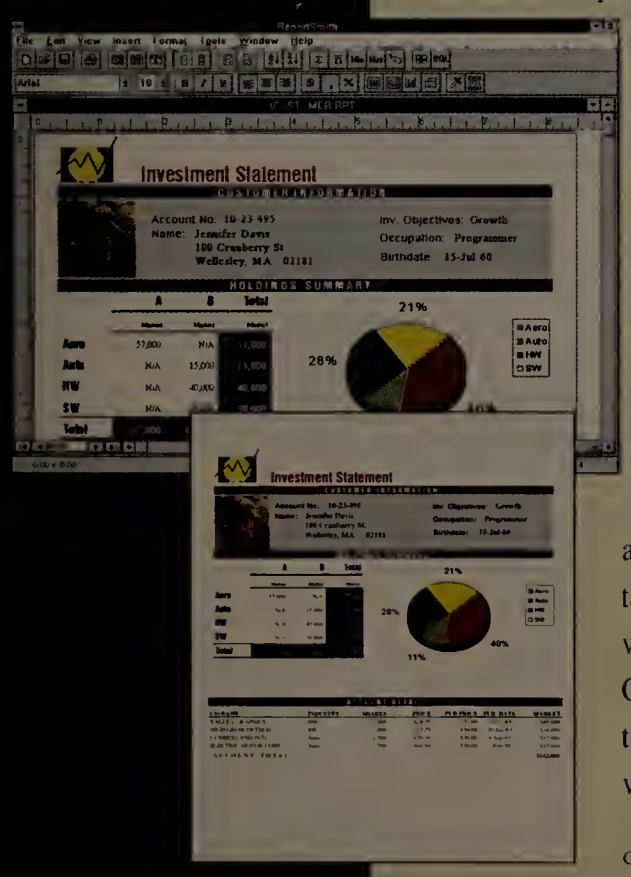


New ReportSmith 2.5
The well-connected SQL report writer.

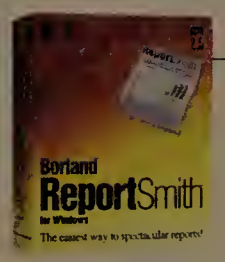
The easiest way to meet your most demanding reporting requirements. Whether you're an occasional user, a power user or an applications developer, you'll quickly discover how fast and easy it is to create reports from your data with new ReportSmith® 2.5. Seamless connectivity to every major SQL and PC database lets you work directly and interactively with the "live" data. And since it's WYSIWYG, there are no more symbols or mock-ups to interpret.

Combine results from different databases in a single report. And that's just the beginning of ReportSmith's Client/Server power. With ReportSmith's memory management technology, you'll get your report finished fast no matter how large the data set. ReportSmith automatically manages memory to give you the best possible performance, and true Client/Server query processing options optimize report production.

For developers there's more . . . much more. A Data Dictionary allows you to display meaningful business-oriented names for views, tables, and fields, enabling your users to get the information they need with a minimum of fuss. A built-in macro language and full DDE and OLE 2.0 support help you integrate ReportSmith into other applications. Find out just how fast and easy it is to create spectacular reports with ReportSmith — the well-connected SQL report writer.



Get Connected Now.
Call 1-800-336-6464, ext. 9675
In Canada, call 1-800-461-3327



Client/Server Solutions

Reporting and Query Tools

Application Development

Decision Support

SQL Databases

Borland
The Upsizing Company

Copyright © 1994 Borland International Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. BI 7739

If you haven't seen our White Papers . . .

PowerPC: The New Generation of Computing

Manufacturing Execution Systems

Application Development Tools

Groupware: Changing Business for the '90s

Upsizing with Digital's Alpha AXP and Windows NT

Document Management

Manufacturing Series Part 1: Customer-Oriented Manufacturing Systems

Achieving Interoperability

Manufacturing Series Part 2: COMMS Enablers and Access Tools

Workflow Technology

Manufacturing Series Part 3: Enterprise Integration Strategies

Client/Server Application Directions: Oracle's Cooperative Initiative

Wireless Communications

Component Software

Manufacturing Series Part 4: Intelligent Manufacturing Business/Control Systems

or our Custom Publications . . .

Enterprise Application Development

Transforming Data Systems into Document Systems

Enterprise Networking

Beyond RDBMS: PostRelational Database Technology

The Dawn of Choice: Processor Alternatives Herald New Era in Computing

Object Technology Profiles

Computing Strategies to Maximize Competitive Advantage

PowerPC Source Newsletter

Profiles in Enterprise Automation

Real Solutions to Real Business Problems

Call for your complimentary copy:

Heidi Broadley
at (800) 343-6474

Quantities available for $1 per copy

"You can be a sheep, or the shepherd."



The choice gets more critical.

The continuing explosion in information technologies is providing unprecedented opportunities for products, services and vendors.

The competition knows it.

Being informed gives the winning edge to the corporate executive who moves on to fresher fields, while the others contentedly graze the old.

For that reason, CW Custom Publications created The White Paper Program, The Computerworld Solutions Series, and multi-sponsored supplements offering inside information on emerging technologies. We work with giants like Motorola, Apple, OSF, Price Waterhouse, Oracle, IBM, UniForum, AIIM, SunSoft, OMG and many others.

Watch for CW Custom Publications — produced for the corporate leader who has learned that the first one to move ahead never has to fear being left behind.

Custom Publications. COMPUTERWORLD

FOR MORE INFORMATION, CONTACT CAROLYN NOVACK, PUBLISHING SERVICES DIRECTOR,
CW CUSTOM PUBLICATIONS, BOSTON. 1-800-343-6474

©1994 Computerworld Custom Publications.

COMPUTERWORLD

Forecast

Roadwork: Building the Infobahn

Re-engineering IS

Client/Server's New Order

The Disconnected Worker

95

In This Issue

20 Roadwork: Building the Infobahn

20
Business users will venture onto the Internet in 1995 — but cautiously. ▼



24
Security and reliability worries are sparking a boom in private commercial services.



25
Opening an electronic storefront isn't that big a deal, but you have to be ready to do business differently. ◄

28
Worries about invasions of privacy have marketeers stepping carefully around the data they collect.

38 Re-engineering IS

38
Remaking your IS organization for the future doesn't have to be excruciating if you follow some basic principles. ►

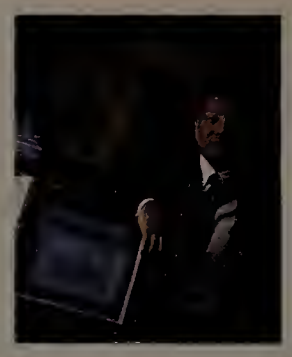


40
To centralize or not to centralize IS? There's more than one way to skin the re-engineering cat.

42
Crushing workloads are prompting new partnerships between overworked IS departments and outsourcers.

48 Client/Server's New Order

48
Picking tools and technologies from industry veterans used to be safe. Today, small newcomers rule the roost. ►



49
Lesser-known software stars are fueling the charge into the client/server world.

53
Big changes lie ahead in client/server systems management, including the emergence of applications management.

56
Computerworld polls industry leaders to determine how the big-name vendors stack up in the client/server biz.

60 The Disconnected Worker



60
Coping with 'round-the-clock support for a growing army of remote computing workers is getting easier — but proceed with caution. ◄

64
Here's a short list of wireless buzzwords you'll have to know in the unplugged future.

64
Tapping in from the road used to be a jury-rigged operation. Secure ways now exist to weave remote users into the corporate web.

65
How to make yourself into the "Totally Wired Road Warrior."

30
We check out the major on-line services so you don't have to.

31
The on-line age offers plentiful job opportunities — if you have the right skills.

34
MIT Media Labs' Nicholas Negroponte warns not to underestimate the impact of the Internet.

35
CIOs and industry executives tell what the Infobahn means to them.

46
You can retrain IS staffers with outmoded skills, but do it early and often.

46
Don't cut yourself off at the knees when it comes to training: You'll pay one way or another.

47
Get focused! Allan Alter lays out some guidelines for modifying IS to fit the current business growth cycle.

47
If last year was any indication of managing the colossal challenges to come, keep your eye on this group of IS execs in '95.

58
Frenetic consolidation in the internetworking market promises to continue this year — but calmer seas lie ahead.

59
You thought 1994 was turbulent? Watch out for the software tsunamis of 1995, two industry analysts warn.

59
A handful of analysts give their predictions for the coming year's top client/server stocks.

66
Remote access poses security risks that will keep you up at night. There's no easy out, but if you're proactive and follow commonsense rules, you may get some sleep.



66
Privacy for ordinary cellular phone calls is almost nonexistent. At last, a new breed of wireless data network with built-in security is coming your way. ◀

67
As the trend toward telecommuting and work-at-home continues to grow, companies are turning informal guidelines into corporate policy.

FORECAST ISSUE DESIGNED BY STOLTZE DESIGN



One heck of a ride

Editor's Note

Take a deep breath. If 1995 is anything like the year just concluded, it's going to be one heck of a ride.

When we sat down to pick the top trends for the coming year for this annual issue, four topics fairly leaped out.

First was the information highway. With U.S. corporations connecting to the mother of all networks at a rate of 2,000 servers a month, the Internet is now the place computer users just have to be.

The coming year will be a time of consolidation as newcomers try to find a purpose for the 'net beyond E-mail and rec.humor. Expect to see more sophisticated Internet services, advertising on the 'net and even ways to use your credit-card number on-line with impunity. See our leadoff section, **Roadwork: Building the Infobahn**, for details.

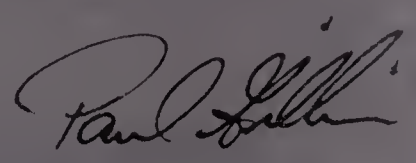
Then there's re-engineering, IS style. Corporate restructuring, decentralization and accountability concerns have IS departments remaking themselves more often than a Transformer toy. What's troubling management is that there's no clear trend here. Decentralization is in, but so is consolidation. Cutting budgets is fashionable, but so is investing in IS for competitive advantage. One thing's for sure: No one has come up with a reliable and cheap way to retrain all those Cobol programmers. Our section on **Re-engineering IS** offers anecdotes and advice for the confused. You're not alone.

Third, we looked at the client/server industry. IS organizations are throwing past practices to the wind and betting big development dollars on companies that do less business in a year than IBM Dallas does in a day. Now that every vendor is a client/server vendor, the market will begin to pick some winners. Our section on **Client/Server's New Order** gives you some ideas on who's in and who's out.

And technologywise, the most interesting developments of the past year were made to fit under the seat in front of you. Mobile computing has entered the mainstream, and the pace of innovation will accelerate in 1995. Ubiquitous wireless communication is not too far away, and the laptop is becoming a full — although only occasionally connected — node on the corporate network. **The Disconnected Worker** will be your guide to some neat mobile technologies as well as the painfully realistic security risks that accompany them.

And check out a special edition of our technical sections beginning just after the editorial page for a look at other technology areas.

So toast the new year, and fasten your seat belt.



Paul Gillin, *Editor*
Internet: *pgillin@cw.com*

The World's Leading M Can Help You Create Your



What would you do with manufacturing software that could communicate real-time changes in volumes and product mix to plants all over the world and their suppliers? What would you do with manufacturing software that could switch from one form of manufacturing to another, depending on changes in the market? Or with software that linked your customer service system to a real-time customer database?

You'd start a revolution. And Customer Focused Manufacturing (CFM), created by Computer Associates, would help you lead the way. A "blueprint" for enterprise manufacturing solutions, CFM lets you do more than build great products. It lets you build closer relationships with the lifeblood of your business: your customers.

Because with CFM, you're involved in an ongoing dialogue with your entire supply chain. From the smallest supply vendor right up to the largest retailer. So you know exactly what can be delivered and when the delivery can take place.



As the needs of your business change, CA business applications are flexible enough to change with them.

COMPUTER ASSOCIATES®
Software superior by design.

©1994 Computer Associates International, Inc., Islandia, NY 11788-7000. All other product names referenced herein are trademarks of their respective companies.

anufacturing Software Own Industrial Revolution.



And with CFM, a full range of multi-platform solutions helps you respond to customer demands both quickly and profitably.

For instance, CA-PRMS® gives you the flexibility to easily meet your co-existent manufacturing needs with support for discrete, process and repetitive manufacturing.

CA-MANMAN/X® gives you the power to manage entire product life cycles – from engineering design to mass production – with real-time planning.

CA-MANMAN® gives you immediate access to timely information and the ability to share that information across all manufacturing areas.

CA-KBM™ incorporates and automates people-based product knowledge and dimensionally engineered-to-order configuration where it's needed most: throughout the entire supply chain.

CA-CAS® is an enterprise-wide manufacturing and financial management system that decentralizes decision-making by delivering critical customer-based information right to your users.

CA-Warehouse BOSS™ is a comprehensive warehouse management system that improves customer service by cutting order cycle times and increasing shipping accuracy.

For More Information On CFM, Please Call 1-800-225-5224, Dept. 16102.

So phone today. And get a closer look at how Customer Focused Manufacturing can revolutionize your world.

Customer Focused Manufacturing Software

CA-PRMS · CA-MANMAN/X · CA-MANMAN · CA-KBM · CA-CAS · CA-Warehouse BOSS

Roadwork: Building the Infobahn

Never has so much been written and said about something so few people understand. The information superhighway was the computer industry story of 1994. But what the heck is it? Turns out the Infobahn, as it's been nicknamed, is different things to different people. Some of those people will start to make serious money with it in 1995. Read on for tips on translating the lingo and navigating these still uncharted waters.

Cruisin'

Business users will venture onto the Internet in 1995 — but cautiously

By Gary H. Anthes



The first thing you need to know about Internet commerce is that it doesn't exist.

Yes, businesspeople have been sending electronic mail over the 'net for years, and companies have begun putting up home pages on World-Wide Web servers faster than you can say http://www.xyz.com. But if you define commerce as real buying and selling, it is still largely done face-to-face, by voice telephone and "snail mail."

But that should begin to change in 1995.

Companies will continue moving into cyberspace in droves, setting up "dot com," or commercial, accounts. And many will present a digital face to the networked masses via the Web, a hypertext-based system for accessing Internet resources via browsers such as Mosaic.

According to Michael J. Walsh, president of Internet Info in Falls Church, Va., the number of companies with .com addresses will double in 1995 to 50,000, and the number electronically enabled by the Web will skyrocket from 1,000 to 5,000.

Meanwhile, 1995 will mark the birth of real Internet commerce, slowly enabled by new technologies, such as security and digital cash, and leading-edge companies willing to take the plunge.

"The number of transactions consummated on the Internet — as opposed to being facilitated by the Internet — is very small now because the required technology is just starting to filter out," Walsh says. Better security technology, in particular, will arrive on the scene in 1995, he says.

Among the recent events moving the technology along are the following:

- Microsoft Corp. and Visa International, Inc. teamed to develop software that will allow buyers to encrypt credit-card numbers and other information sent over the network.
- Netscape Communications Corp. in Mountain View, Calif., and First Data Corp. in Omaha announced a service by which merchants, banks and buyers conduct commerce on the Internet using encrypted credit-card transactions.
- Open Market, Inc. in Cambridge, Mass., introduced a package of tools for creating and managing an on-line business and a system for processing secure payment transactions, initially by credit card and later by other means including digital cash (see related story page 24).
- First Virtual Holdings, Inc. in San Diego announced a system to match electronic buyers and sellers and process Visa payments without sending credit-card numbers over the 'net.
- MCI Communications Corp. and Netscape introduced an on-line shopping service protected by encryption. The encryption can be activated automatically or by the shopper.

While financial transactions enabled by these developments will begin to flow across the 'net in 1995, most companies will be content to get their feet wet by simply posting information on the Web. GE Plastics, a $6 billion subsidiary of General Electric Co., will begin its first full year on the Internet with 1,500 pages

Life on the Info Highway

Sept. 1, 1969
The first connections are made in the building of Arpanet, the U.S. Advanced Research Projects Agency's computing network.

October 1972
The first public demonstration of Arpanet is given at a conference in Washington.

October 1984
The Computer Fraud and Abuse Act becomes law, making unauthorized access to computers used by the federal government or for interstate and foreign commerce a felony.

1987
The National Science Foundation creates the backbone to the National Research and Education Network. The Internet as we know it is born.





Nov. 2, 1988
At least 6,000 and possibly as many as 250,000 computer systems connected to the Internet, including those at the Department of Defense are attacked by a worm virus.

Jan. 22, 1990
Robert Morris, a Cornell University graduate student, is convicted of tampering with a computer and spreading the 1988 virus. Morris is the first person to be convicted under the Computer Fraud and Abuse Act.

Feb. 11, 1991
The term "information superhighway" first appears in the popular media as the Bush administration signs on to Sen. Al Gore's idea to develop a high-speed national computer network and a new generation of swift computers.

January 1992
Sen. Gore's High Performance Computing Act is signed into law. It will provide $3 billion, with $1 billion in new funding over a five-year period, to develop a high-speed computer network and support more R&D in high-performance computing.

of on-line product data for buyers and users around the world.

"A year or so ago, we said to ourselves, 'We haven't changed fundamentally the way we communicate with our customers for a long time,' " says Richard Pocock, general manager of marketing communications at GE Plastics. "And yet, the pace of change in information technology has been extreme. What are we missing?"

After considering a number of options such as CD-ROM, the company decided on the Internet, mostly because of its around-the-world and around-the-clock reach. One month after setting up its Web server, GE Plastics was getting some 12,000 hits a month on its home page from buyers and users looking for information about the company's products.

According to Pocock, GE customers can now get in minutes information that would have taken three days via a telephone call and snail-mail delivery. "I believe it definitely gives us a competitive advantage," he says.

Pocock admits it is too early to assess the costs and benefits of the new service, but he says he expects incremental costs to be offset by savings in the printing and distribution of paper products.

One month after setting up its Web server, GE Plastics was getting some 12,000 hits a month on its home page from buyers and users looking for information about its products.

"It is only a matter of time before the Internet becomes a very dominant business-to-business communications tool," Pocock says. "We see this as an opportunity to establish a plastics community tied together via the 'net. We want to create a dialogue with a large community that's otherwise difficult to have."

The hitch

Others are less enthusiastic. "We are concerned about [the Internet] evolving into the de facto National Post Office, and we're worried about its ability to scale up, both technologically and administratively," says Ray Hoving, chairman of the Society for Information Management's (SIM) National Data Highways Advisory Council.

Hoving praises Internet architects for taking the network of networks this far, but he and his fellow SIM members worry that as the Internet continues to mushroom, it will grow increasingly unfriendly and its business users will be engulfed by useless information. "They say that out of chaos comes order, but out of order can come chaos," he says.

"Technologically it may be able to scale up," Hoving says. "But imagine the chaos as it becomes an end-to-end commercial marketplace. There's going to be a backlash to all this information overload if it's not managed well."

Hoving also warns of the possibility of a "bait and switch" scenario. He points out that while current Internet use is generally considered cheap or even free, costs could escalate dramatically when the Internet becomes more commercialized.

Despite these concerns, businesses should be exploring the 'net's potential, Hoving says. "My advice is build [security features], get on and surf the 'net," he says. "We [SIM CIOs] have had our heads in the sand about the Internet, and we have to wake up to this."

Follow the leader

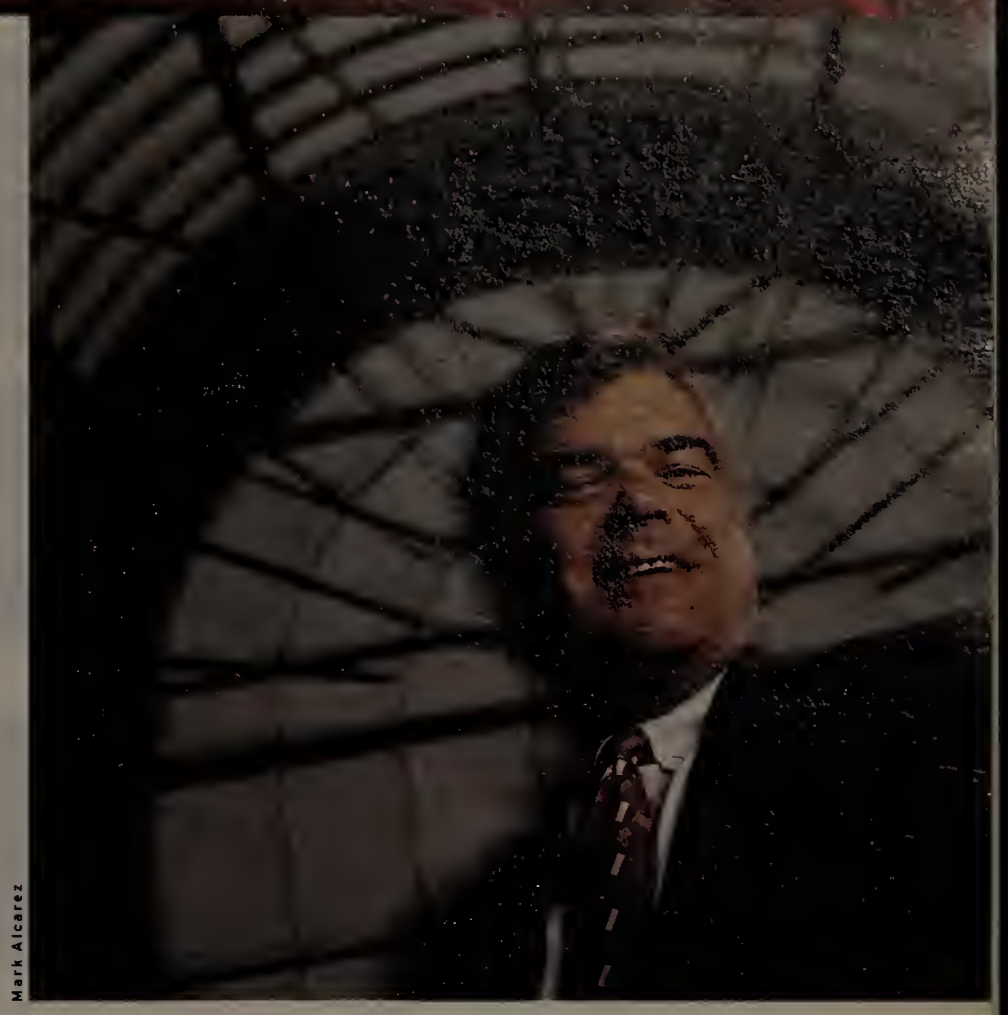
Nevertheless, Hoving, director of MIS at Air Products and Chemicals, Inc. in Allentown, Pa., says his company may follow in the footsteps of competitor GE Plastics by putting an electronic catalog on-line.

Hoving says Air Products might move its electronic data interchange applications from a non-Internet network provider to the Internet. But for now, "financial and legal transactions will stay off the Internet until it's proven to be much more secure and an appropriate way to send business transactions," he says.

Menlo Park, Calif.-based CommerceNet, a 62-member consortium of companies interested in electronic commerce, is developing technologies and standards intended to lure companies such as Air Products into the Internet marketplace. "A year from now, there will be Internet transactions that are secure, and there will be some form of payment on the Internet," says Cathy Medich, executive director of CommerceNet. "That's fairly straightforward."

Medich says a CommerceNet working group will set up pilot electronic data interchange (EDI) projects. "Companies see the Internet as a [cheaper way to accomplish] some EDI transactions," she says.

For some users, the Internet offers greater security than traditional means of communication. "We, as lawyers, are well aware of the dangers of misdirected fax — for example, people winding up with their adversary's game plan," says Kenneth C. Bass, an attorney in the Washington office of Venable, Baetjer, Howard & Civiletti. The dangers of Internet E-mail are exaggerated, he says. But nonetheless, Bass says he uses a $100 encryption product to protect confidential communications with clients.



Mark Alcarez

GE Plastics' Richard Pocock says the Internet delivers competitive advantage

Anthony M. Rutkowski, executive director of the Internet Society in Reston, Va., says the group takes unencrytped credit-card numbers from its members over the 'net for conference registration. "As it turns out, not a lot of people are concerned about that any more than they are concerned about using the telephone," he says.

Rutkowski advises companies to get on board the Internet ship. "You basically can't lose," he says. "The cost of a [Web server] is minuscule in terms of its ability to provide services. There is nothing equivalent."

According to Walsh, some network service firms will maintain a Web home page for a company for as little as $25 a month. Costs are related to the bandwidth provided, he says.

Bass says his law firm was the first in the world to set up a Web server. "It has brought us recognition and contacts, and it supplements our traditional publishing activities." ✦



March 4, 1993
President Clinton visits Silicon Graphics; a digitized version of the video feed is simultaneously made available to employees who watch from their workstations and to those on the Internet with the necessary hardware and software.

April 1993
"Internet Talk Radio" debuts. Internet users can listen to the weekly, pretaped, half-hour show and respond via E-mail.

June 1, 1993
President Clinton and Vice President Gore get Internet E-mail addresses.

September 1993
Paramount Communications says it plans to discuss a possible merger with Viacom.

Sept. 20, 1993
QVC Network launches a $9.5 billion hostile takeover bid for Paramount. The company proposes to pay for the acquisition in cash.



Oct. 13, 1993
Bell Atlantic announces its plan to acquire Tele-Communications, Inc. (TCI) in a deal valued at $33 billion. It would be the largest merger in history.

November 1993
Pacific Bell announces its plan to spend $16 billion on the information highway.

Dec. 16, 1993
Yes, Virginia, there really is a Santa Claus. Delphi Internet Services offers E-mail service to Santa at the North Pole. Santa's box gets 800 messages in four days.



January 1994
MCI Communications announces its plan to spend $20 billion over a six-year period to construct an international information highway.

NAME ANY COMPANY

THAT DOES SOMETHING

BETTER THAN

As you may already know, Digital has beaten everyone else to 64-bit computing, which, among other things, offers 4 billion times the data addressing capacity of current 32-bit systems.

The point is this: our Alpha technology not only is much faster and far more powerful, but it could be decades before your company outgrows it.

No wonder it's emerging as the architecture of choice for the hottest industries and technologies of today, such as interactive video, medical diagnostics, advanced telecommunications services and more.

Not to mention, any forward-thinking company wishing to invest in the system of tomorrow. A system with 6,000 applications ready to go, right now. A system that can help them do in minutes what they used to do in hours.

Everything from CAD and complex financial modeling, to database solutions and beyond. Interestingly, our competition is starting to announce that they too will have 64-bit systems. The only question is, when?

Of course, in all fairness to our competitors, we don't always outperform them by a margin of 400 billion percent. Sometimes, the margin is only a few hundred percent. Or a few tens of thousands of

JFL

© 1994 Digital Equipment Corporation. Digital, the DIGITAL logo, AlphaServer, AlphaStation and LinkWorks are trademarks of Digital Equipment Corporation.
All other products are trademarks or registered trademarks of their respective companies.

IN ANY INDUSTRY

4 BILLION TIMES

THE COMPETITION.

dollars. Take servers. Our AlphaServer™ 2100 4/275 runs rings around its higher-priced competition. It's up to 50% faster than the Sun SPARCServer™ 1000E, at two-thirds the price. Supports nearly three times more memory than the HP 9000™ H70. And has twice the internal disk storage of the new IBM RS/6000™ J30.

Would you like another example? Take workstations. Our AlphaStation™ 400 is the most powerful in its class. Take networking. A Digital invention, networking is being brought into the future by more Digital inventions like LinkWorks™ software, a solution that allows everybody in your organization, regardless of the platform they're on, regardless of the operating system they're using, to work together better than they've ever worked before.

No one else has anything like it. Fact is, Digital is better at tying multiple platforms and operating systems together than anyone. Of course, we aren't 4 billion times better at it than our competition. But rest assured, we're working on it.

For details, please call 1-800-DIGITAL or reach us via our Internet address: moreinfo@digital.com.

digital™

PLAYING IT SAFE

Security and reliability worries spark a boom in private commercial services

By Erin Callaway

Before you set up shop on your own Internet host, consider this: a new breed of companies is emerging to offer merchants the tools to build on-line storefronts *and* the networks on which to put them. They're also promising a reasonable degree of security on an inherently insecure network. But more users will have to sign on to the idea before it is clear how successful these services will be.

For example, Open Market, Inc. in Cambridge, Mass., has created a forum for electronic commerce complete with a security system that "challenges" customers to identify themselves with personal information before they can complete transactions.

"When customers open an account, instead of passwords that can be easily memorized, we ask them for information only they can know," explains Shikhar Ghosh, chief executive officer of Open Market. "We use things like their pets' nicknames or their favorite color or movie," he says.



Larry Goode

Secure enough?

Open Market is geared toward merchants who want to sell everything from $2 documents to $1,000 software. The difficulty and number of challenges the system poses correlates to how much money is transferred and the value of the goods being sold.

In addition to the challenges, Open Market issues onetime-use personal identification numbers and smart cards for higher-level transactions. While Ghosh says he is confident these measures are appropriate, it will take actual commerce on the system to show whether customers will tolerate them.

Ed Parkin, senior director of enterprise information services at Mead Data Central in Dayton, Ohio, says Open Market's thoroughness in dealing with security is one reason his company is considering doing business with them.

"They have really thought through billing, tracking and protecting intellectual property, which seems to be an afterthought at some other companies," Parkin says.

According to Ken Cutler, vice president and director of the Information Security Institute in Woodbridge, Va., talking about security is a start, but it is not enough. "These guys are potential hired guns. You have to assume that anything you do across the Internet is totally at risk," he says.

To protect themselves, Cutler says on-line merchants should make sure they negotiate a contract that includes specific references to the security measures being offered. More important, the contract should clearly outline who will be responsible for damages if a system is violated.

"You can gauge how trustworthy these people are depending on how far they are willing to walk the plank in a contract," Cutler says. "Not only should they arrange for regular audits themselves, but they should be willing to submit to audits arranged by the merchants as well."

First Virtual Holdings, Inc. in Cheyenne, Wyo., has tailored its first electronic marketplace to merchants who want to sell information such as electronic publications. Its security system uses Internet electronic mail to authorize transactions but relies on the tenet that a few "freebies" here and there are good advertising for information sellers.

In fact, First Virtual's chief scientist, Nathanial Borenstien, says merchants' conventional method of giving potential customers just a piece of the information they want to buy isn't adequate.

"Of course we expect customers to pay for what they download," Borenstien says. "But you can't truly evaluate information until you see the whole package. On our system, that means you either own it or you don't."

First Virtual bans customers from shopping on the network if they abuse the privilege of obtaining merchandise before they pay. Likewise, customers have the right to refuse payment if their account is used fraudulently. However, the system tracks how often they register such complaints and boots them out if they lodge complaints excessively.

Positive results

Michael J. Walsh, president of Internet Info in Falls Church, Va., sells market research on business use of the Internet through both Open Market and First Virtual. Although the companies are brand new, so far, Walsh says he's pleased with what he's found there.

"I figured it would be like being the only store open in a huge mall," Walsh says. "But even though I didn't expect a lot of shoppers right away, I've already had a couple of dozen sales between both systems in just a few weeks."

Walsh did suggest that both companies have to smooth some edges to make their systems more appealing to people who aren't used to the Internet, but he says they seem to be making the right strides. "They'll definitely attract the 'netizens' of the world," he says.✦

Jan. 11, 1994
Vice President Gore makes his debut on the Internet in a 45-minute, real-time conference sponsored by **U.S. News & World Report** in conjunction with CompuServe.

Jan. 24, 1994
In a **Computerworld** column, Esther Dyson writes, "I am supposed to give the U.S. government advice about defining and regulating the National Information Infrastructure (or leaving it alone). Presumably, I should represent someone, but who?"

Feb. 24, 1994
The TCI/Bell Atlantic merger is officially pronounced dead.

April 19, 1994
The New York Times calls the information highway the "infobahn."

July 8, 1994
Stockholders approve the Viacom/Paramount merger.



July 21, 1994
McDonald's runs the first on-line ad in its six-week campaign on America Online.



November 1994
CommerceNet, a consortium of companies starting to do business on the Internet, receives the Pacific Bell California Research and Education Network, or CalREN, award, a $520,000 grant to facilitate Internet connectivity and electronic commerce.

October 1994
The White House "home page" debuts on the Internet. An estimated 1,300 people an hour take multimedia tours of the nation's capital. The biggest draw: sound bytes of the Clintons' cat, Socks, meowing on-line.

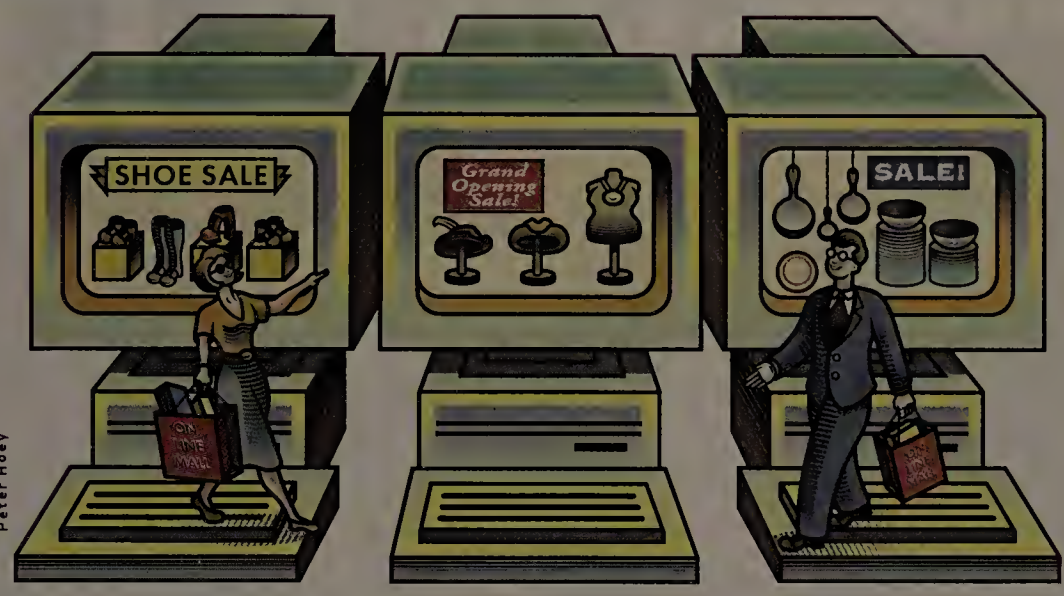
– Compiled by Erin Callaway

Sources: Business Week, The New York Times, The Wall Street Journal, Time, Fortune, CNN transcripts, The Internet For New Users by Daniel P. Dern, Electronic Messaging News, Computerworld and the White House media office.

Down to the CYBERMALL

Putting your sales on-line may have an unplanned impact on your bottom line

By Michael Sullivan-Trainor



Just before Thanksgiving, Dave Bailey, a senior marketing analyst at United Parcel Service, Inc. in Atlanta, wasn't thinking about turkey. Instead, he was counting transactions. UPS had just entered the on-line world with an electronic storefront on CompuServe. Twenty to 30 transactions were logged during the first few days of test runs, and Bailey was awaiting the storefront's grand opening. That's when the services would be announced on CompuServe's What's New area.

In December, the company opened a storefront on Prodigy, and shortly, customers will be able to arrange for UPS package deliveries through America Online and the Internet.

Bailey has some advice for other large companies that want to follow UPS's lead. "You need buy-in throughout the whole organization before you give customers electronic access to your services," he says.

As companies gear up to open on-line sales channels, they should beware of expectations that on-line storefronts will be like their off-line counterparts. Special attention must be paid to an interactive presentation and smooth back-end order fulfillment.

The first question many companies ask about going on-line is: Will it be worth it? In UPS's case, Bailey says it will be less expensive to sell services on-line than through normal channels. He also expects to generate new business.

"Having an on-line presence directly targets those who are less frequent users of our services and gives them unique access to UPS," Bailey says. "Our competitors aren't on-line yet, and that gives us an edge where we can generate some allegiance to our service."

The firm now targets high-end customers — those who send 50 or more parcels a week — through intensive marketing, but there are no major efforts aimed at getting infrequent users to use the service more often.

Bailey says on-line users will become more aware of UPS through the company's on-line presence than through normal marketing efforts. He also sees them using the company's services more readily than competitors' because on-line access will be easier.

At 800-Flowers, one of the many small company on-line success stories, Ellaine Rubin, manager of interactive services, says selling on CompuServe saves the company 10% to 30% — primarily by cutting out direct mailings and phone operators. In addition, 5% of the firm's $100 million in revenue is generated via on-line orders.

"We are definitely acquiring new customers and having current customers purchase more cost effectively on-line," she says, "It's also easier to keep in touch with them."

New customers

JC Penney Co., which has been selling on Prodigy for five years and on CompuServe for four, nets a "very small" revenue stream from its electronic storefronts, according to Marisha Konkowski, new business development project manager for electronic retailing. But the company is happy with its on-line effort because it targets a different set of customers than the traditional, primarily female population that uses the retailer's catalog.

From a technical standpoint, preparing a firm to sell on-line is fairly straightforward. But gaining understanding and commitment from different parts of the organization is far from simple. Two areas where the company has to agree on presentation and process are the following:

- A storefront that presents the company's products and services in an easy-to-access, interactive and dynamic format. This can range from mostly text descriptions to full-fledged graphical presentations.
- The back-end connections that allow a customer's order to be quickly logged, filled and tracked by the organization. At worst, these connections can involve downloading orders from the storefront and rekeying them into back-end systems. At best, they link customers to fulfillment so that customers supply all the necessary demographic and credit-card information directly into company systems.

"Few companies have the back end waiting," says on-line consultant Richard Masterson, a principal at Mastersmith, Inc. in New York and Philadelphia. "Everybody has their eyes on the front door and how they can make it attractive."

Ample hardware platforms, development tools and networking options are readily available today. As with many IS projects, the devil lies in obtaining internal agreement. Sales and marketing must determine what the storefront looks like. Operations must decide how the back-end process works; and senior management must assign sufficient resources to get the job done.

"Our biggest challenge has been putting together a team," says Diane Solberg, electronic media merchandising coordinator at mail-order company Lands' End, Inc. in Dodgeville, Wis., which has been a CompuServe Electronic Mall resident since March 1993.

Lack of commitment to on-line projects can be a major stumbling block to success. "Many companies start with a high level of support, but six to eight months into the project, they're delighted to assign it to a part-time summer intern," says Keith Arnold, general manager of the Electronic Mall on CompuServe.

The 150-store mall — the oldest on-line sales presence — opened in 1985. Occupants include JC Penney, Sears, Roebuck and Co., Lands' End, Brooks Brothers, the Metropolitan Museum of Art and 800-Flowers.

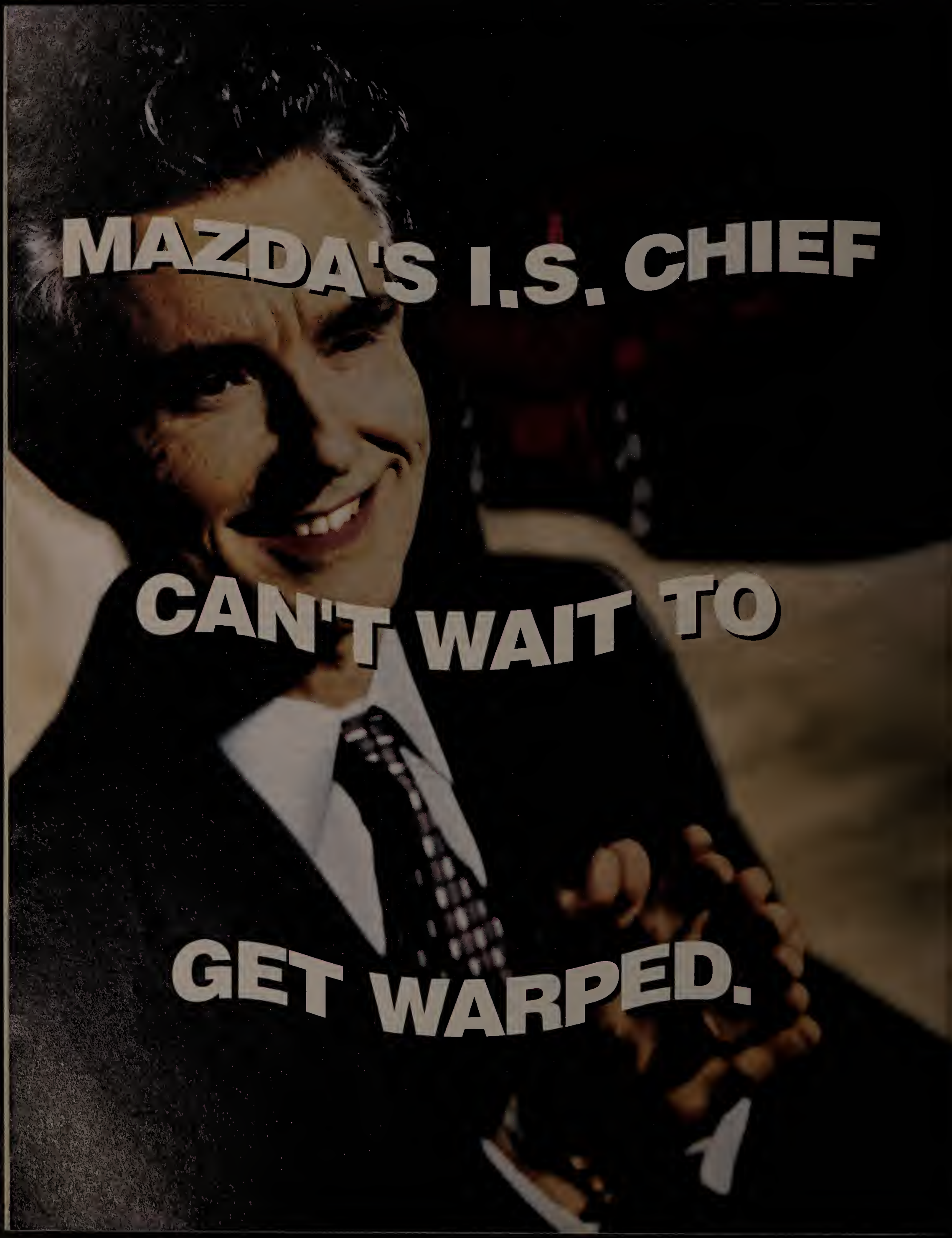
Like UPS, Lands' End is branching out with moves to Prodigy, CD-ROM marketing on the Internet and participation in interactive pilot projects such as Star Gazer from Bell Atlantic Corp. in Arlington, Va.

With more than 6 million users of commercial on-line services now and more than 13 million expected by 1998, environments such as CompuServe, Prodigy and America Online are secure, structured proving grounds where companies can experiment with on-line sales and target audiences. CompuServe claims 2 million users, mostly businessmen; Prodigy claims 2 million users, with more women and children than CompuServe; and America Online claims 1 million users and a younger, more consumer-oriented crowd.

> "Many companies start with a high level of support [for on-line projects], but six to eight months into the project, they're delighted to assign it to a part-time summer intern."
>
> — Keith Arnold, general manager, CompuServe's Electronic Mall

There are also a host of new services for setting up on-line storefronts coming in 1995, including Microsoft Corp.'s Microsoft Network, formerly code-named Marvel.

"A year from now, we'll probably still be experimenting with different things," Solberg says. "We want to see what customers react to. It's hard to see what's going to hit or miss." ✦


MAZDA'S I.S. CHIEF
CAN'T WAIT TO
GET WARPED.

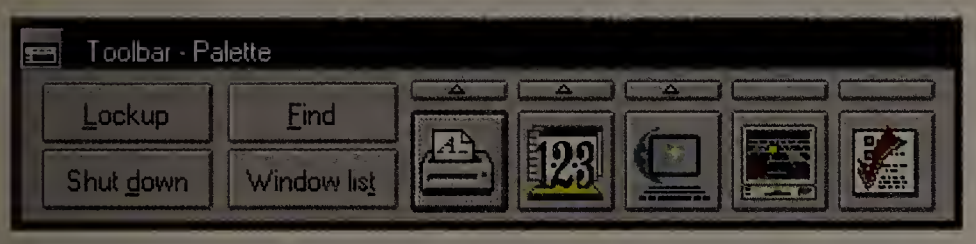


OS/2 is in its third rev, so it's solid, stable, and mature.

IT'S ONE MODEL THEY REALLY NEED ON THE ROAD.

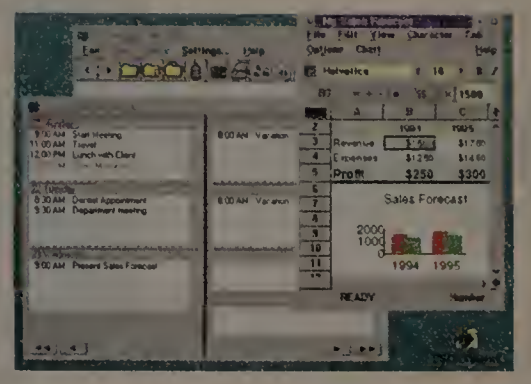
Mike Anzis is the I.S. man behind the wheel of Mazda's computers. And OS/2® Warp is about to make his life easier.

As Mike puts it: "We use OS/2 on our headquarters' client/server systems. It's also installed in our 900 dealerships. But until now, we haven't been able to get OS/2 everywhere we need it–on laptops in the field. OS/2 Warp changes all that." OS/2 Warp is the 32-bit, multitasking, Windows™-friendly way to run a computer. With simple installation and proven reliability, OS/2 Warp is a total computing solution that performs ruggedly at every level.



A toolbar gets users into their applications quickly and easily.

From a basic 4MB laptop to a client/server system, the OS/2 family now scales an even wider variety of PC platforms.



The BonusPak gives mobile users the applications they need.

And OS/2 Warp is a real communicator. With fax, Internet e-mail, and desktop conferencing, there isn't an easier way to keep those out on the road in the loop.

OS/2 Warp also offers Mike Anzis rock-solid reliability. "I know from years of experience with OS/2, I can trust it to keep performing. Now I can enjoy this peace of mind at every level."

OS/2 Warp is available for under $90. To get warped, stop by your local software dealer, or call 1 800 3 IBM-OS2. Ask for a free demo disk.

The new 32-bit, multitasking, multimedia, Internet-accessed, crash-protected, Windows-friendly, totally cool way to run your computer. **OS/2® WARP**

IBM

OS/2 Warp is available from your software dealer. It's also available from IBM for $89 by calling 1 800 3 IBM-OS2.

Reseller prices may vary. OS/2 Warp consists of OS/2 version 3 and BonusPak. IBM, Operating System/2 and OS/2 are registered trademarks of the International Business Machines Corporation. Crash Protection and the OS/2 logo are trademarks of IBM. Windows is a trademark of Microsoft Corporation. ©1994 IBM Corp. All rights reserved.

What You Don't Know

Privacy advocates can help navigate the mine-laden territory of consumer databases



Katherine Lambert

Bell Atlantic's Edward Young says hammering out the privacy code was a 'very difficult' process inside the company

By Mitch Betts

One way to make big bucks from the information superhighway is to compile detailed information on how consumers use on-line services. Then exploit this consumer "profile" for targeted marketing, promotions and cross-selling campaigns.

But in these privacy-sensitive times, that business model is also the fastest way to get blasted by politicians, the press, privacy advocates and the very consumers who services want to lure.

Just ask America Online, Inc., which was nailed last October by U.S. Rep. Edward J. Markey (D-Mass.) for trying to sell its subscriber data to the direct marketing industry.

"There is the potential to make a ton of money [selling on-line subscriber data], but this is an area where companies need to tread very carefully," warns Mary J. Culnan, an expert on consumer privacy at Georgetown University in Washington. By tracking every touch of a button, "these systems have an enormous potential for surveillance," she maintains.

Tiptoeing through minefields

Aware that a single slipup in the field of consumer privacy can be a public relations disaster, savvy companies are hiring consumer advocates and drafting confidentiality codes to navigate the privacy minefield.

The reason is not so much altruism as it is a marketing imperative. "Who will want to use our on-demand movies service if the list of movies they watch will be distributed elsewhere?" says Edward D. Young III, associate general counsel at Bell Atlantic Corp.'s Arlington, Va., office, which plans an interactive network.

Indeed, a recent public opinion poll found that the types of consumers who are prime targets for the new wave of interactive services — including people who like home-shopping services and watching movies, for example — are the same ones who expect some privacy for their on-line activities.

"To sell them, it's necessary to reassure them," says Humphrey Taylor, chief executive officer of the polling firm Louis Harris and Associates, Inc. in New York.

Of course, consumers are a pragmatic bunch. If you give them a big enough discount to divulge their life story and a say in how that information will be used, they will go along.

What consumers want is *advance* notice of the data collection and how it will be used, the poll found. They also want some control over the types and timing of the advertising messages, and they want to be able to review and correct their data profile.

Getting an edge

In fact, vendors who take a pro-privacy stance may get a competitive edge. "Fair information safeguards may be the very best marketing message for interactive services," says Alan F. Westin, a professor at Columbia University in New York and mastermind of the poll.

The survey found that, so far, consumers are willing to let vendors self-regulate their behavior. "But the American public has a short fuse on this," Westin warns. Political pressure for a federal privacy board to oversee industry practices and act as a consumer ombudsman is a distinct possibility.

So it is not surprising that information-intensive companies such as American Express Co., Pacific Bell, Equifax, Inc., BankAmerica Corp. and Bell Atlantic have adopted privacy codes to address consumer concerns.

Bell Atlantic's policy was triggered in part by bruising battles with privacy advocates and regulators over the Caller ID service a few years ago. Now the company wants to take a more proactive approach and consider privacy implications *before* it rolls out interactive services, Young explains.

But Young acknowledges that hammering out the privacy code was a "very difficult" process inside the company. Typically, the tension is created by the fact that a company's marketers want maximum exploitation of consumer data to ensure the new venture will be a financial success.

By having a privacy advocate on board, the company gets an opposing viewpoint and some expertise about how other companies deal with privacy issues. "You certainly need to have people who will examine things from the customer point of view, not just the financial point of view," Young says.

The corporate privacy policies are not as strong as public interest groups might like, but they are a step in the right direction, says Marc Rotenberg, director of the Electronic Privacy Information Center in Washington.

"The good news is that these companies are becoming sensitive to consumer concerns and are trying to get ahead of the curve on this issue," Rotenberg says. "The bad news is that Washington hasn't caught up."

He says the Clinton administration task force that is drafting privacy guidelines for the National Information Infrastructure has "missed the boat," producing a weak-kneed set of guidelines that give consumers little or no protection.

Policy is no panacea

However, the Clinton administration did have the foresight to establish the task force and try to address the issue before some large-scale privacy disaster occurs.

Many companies have no comprehensive privacy code at all. They drift along with ad hoc decisions until some public relations crisis occurs, and then they scramble to write some privacy rules, according to the book *Managing Privacy* by H. Jeff Smith at Georgetown University.

Of course, having a policy is no panacea. Smith's book points out that many companies have a big gap between their printed policies and their actual practices. Experts warn that business pressures, untrained employees and lax oversight can all lead to privacy abuses — and it will only take a few highly publicized horror stories to make an already-cynical public leery of driving the information superhighway.✦

HIGHWAY RULES

A summary of Bell Atlantic Corp.'s new customer privacy policy

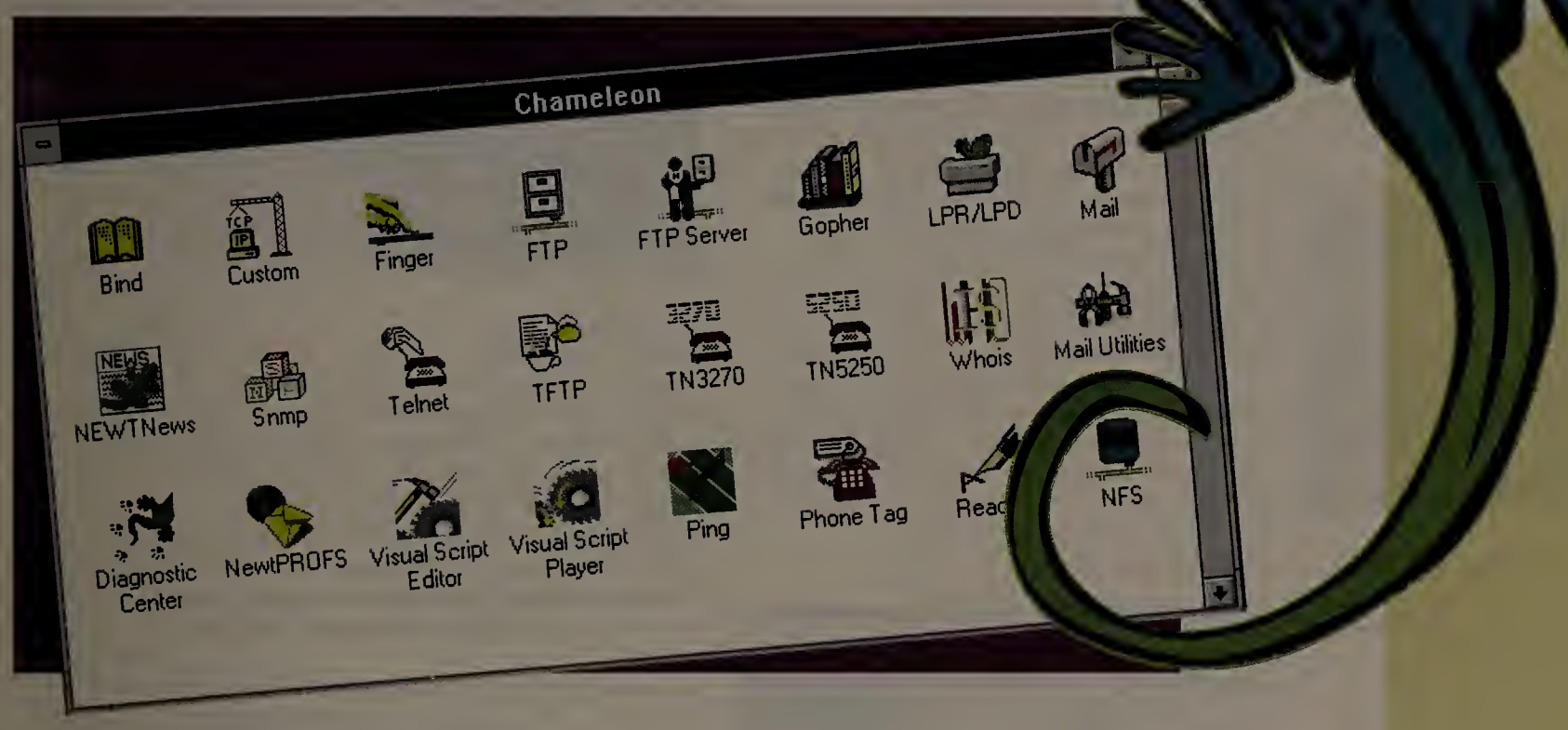
1. Collect only the consumer information that is necessary for current and add-on services.
2. Disclose personal information only for limited purposes, such as long-distance billing, fraud prevention and law enforcement.
3. Tell consumers how information about them is used and how it can be corrected. Allow them to "opt out" of marketing lists.
4. Use advanced computer security techniques and ensure that employees comply with the privacy code.
5. Participate in U.S. and international government proceedings to resolve privacy issues.
6. Evaluate privacy implications before new services are offered.

TCP/IP Applications For Windows.

MICROSOFT® WINDOWS™ COMPATIBLE

yes NetWare Tested and Approved

Network Your PC To The World With Chameleon.



BEST VALUE.

Chameleon is a TCP/IP Windows software suite that offers more applications than any other product. It provides you with a comprehensive Windows solution for TCP/IP networking.

SEVEN INTEGRATED SOLUTION SUITES.

Chameleon includes seven integrated solution suites: terminal emulation, e-mail, file and printer sharing, remote access, network utilities, administration tools, and an easy point-and-click interface into the Internet.

SEAMLESS ACCESS TO OTHER HOST SYSTEMS.

Chameleon includes more applications that allow you to access information on Unix, mainframes, minicomputers, PC-based LANs and WANs, and the Internet.

OFFICE, HOME, AND REMOTE NETWORK ACCESS.

Connect to your network and the Internet via LAN or dialup access with one easy-to-use software package. Send and retrieve email, download files, print documents, login to remote hosts, and run client/server applications. Connect your PC to the world with Chameleon.

NetManage Chameleon includes WinSock TCP/IP and is 100% DLL. Chameleon requires only 6KB memory and installs in just 5 minutes.

Windows Magazine Recommended — Sept. 1994

MVC Editor's Choice — Sept. 1994

Buyers Assurance Seal, PC World — Sept. 1994

© 1994 NetManage Inc., 10725 North De Anza Boulevard, Cupertino, California 95014, U.S.A. Fax (408) 257-6405. Specifications are subject to change without notice. All trademarks are property of their respective companies.

APPLICATIONS INCLUDED:

- Terminal Emulation
  - Telnet: VT100, VT200, TVI, TN3270, TN5250
  - Visual Script Editor & Player
- File Transfer
  - FTP Client & Server
  - TFTP
- File & Printer Sharing
  - NFS Client & Server
  - LPR/LPD
- Electronic Mail
  - SMTP Mail with MIME
  - Phone Tag
  - IBM PROFS
  - POP2, POP3, SMTP
- Internet Access
  - Gopher
  - Newsreader
  - Whois
- Network Utilities
  - Ping
  - Finger
  - Diagnostic Center/Trace Agent
  - DNS Client & Server
- WinSock TCP/IP
  - 100% DLL TCP/IP Stack
  - Windows install and setup
  - LAN: Ethernet, Token Ring
  - Dialup: SLIP, CSLIP, PPP & ISDN

SPECIAL OFFER **Buy CHAMELEON and get ECCO Simplicity for only $30!**

PERSONAL AND GROUP INFORMATION MANAGER

Shared Calendars, Phone Books, and Projects

One copy of ECCO Simplicity with each version of Chameleon purchased
Special offer good thru January 31, 1995

NETMANAGE™

(408) 973-7171
e-mail: sales@netmanage.com
World Wide Web: www.netmanage.com

GETWired

We dig through today's on-line services looking for IS nuggets so you don't have to

By Ellis Booker

Even if commercial networks carry out their pledges to become permeable to the Internet, the variety of on-line options will continue. Commercial networks will be able to give their subscribers services the Internet cannot, as well as a consistent user interface, well-run technical forums and distinct user populations.

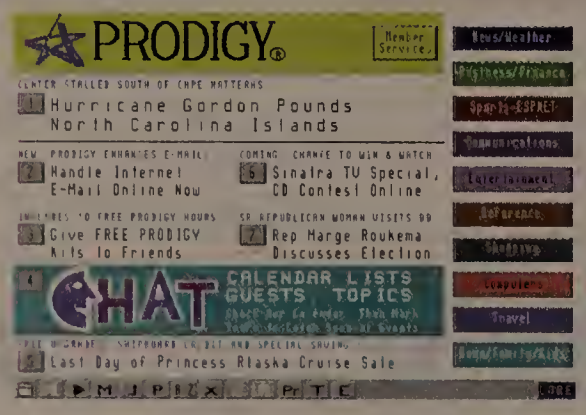
Details change from week to week, but here are some of your top commercial options:



AMERICA ONLINE, INC. (AOL)

(800) 827-6364

Cost: $9.95 per month for five hours, including Internet services.
Access speed: Up to 28.8K bit/sec.; ISDN access coming in the first quarter of 1995.
Internet strategy: Access to Usenet newsgroups, Wide-Area Information Server and gopher databases. FTP access and plans for a World-Wide Web server.
Interface: A slick multimedia interface began shipping in 1994. Ranked easiest to use of the Top 3 commercial networks.
Population: The company estimates it will hit 2 million subscribers by next summer.
For IS professionals: AOL has been aggressively pursuing its Internet strategy through the acquisition of software companies as well as through the $35 million acquisition of Advanced Network & Services, Inc., which had managed the Internet's network backbone for the National Science Foundation.
Overall grade: A



PRODIGY SERVICES CO.

(800) 776-3449

Cost: $9.95 for five hours; extra hours $2.95.
Access speed: 9.6K bit/sec.; support for 14.4K bit/sec. slated for early 1995.
Internet strategy: On Nov. 1, Prodigy launched AstraNet, a separate Web service with a mix of free and paid services. That same month, it bundled a Web graphical browser into its service.
Interface: Some like it; many do not. Prodigy's big, bold graphics can make the service feel toy-like. But the look is being upgraded. In November, for instance, Prodigy finally did away with its 40-character E-mail screen.

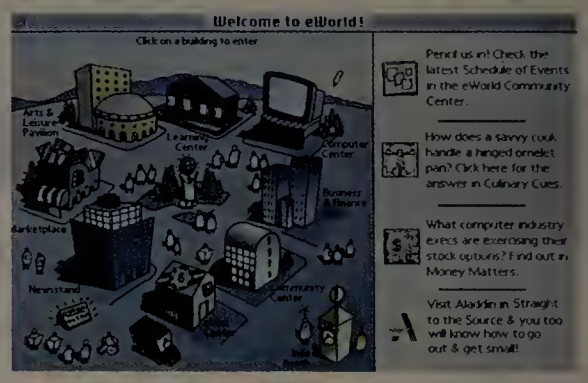
A bigger problem is the service's speed, which even at 9.6K bit/sec. is sluggish.
Population: 2 million
For IS professionals: Unquestionably the most consumer-oriented service, Prodigy is generally not seen as a habitat for IS professionals. On the other hand, it is arguably ahead of both AOL and CompuServe in making its service permeable to the Internet. This could be its strong suit.
Overall grade: B-



COMPUSERVE, INC.

(800) 848-8199

Cost: $8.95 per month for unlimited connect time to basic services. Extended services cost $4 per hour and up.
Access speed: 14.4K bit/sec.; 28.8K bit/sec. planned for first half of 1995; ISDN access in late 1995.
Internet strategy: An FTP service; a Web page coming. Members can log on to the service via the Internet and Telnet to the Internet from within CompuServe. Access to Internet FTP sites from within CompuServe was added in November as was an agreement with Spry, Inc. to let users connect to the Internet via CompuServe's 400 worldwide nodes.
Interface: Icon-based, enhanced menus in the FTP service telegraph the direction for CompuServe's Windows-based CompuServe Information Manager.
Population: 2.4 million
For IS professionals: CompuServe has a deserved reputation for the strength of its 700 vendor forums, which continue to be some of the best places to find technical information and support. However, now that virtually all hardware and software companies have Internet connections, CompuServe's dominance could decline. Speed-based pricing for Internet access is due for a change because it penalizes users who access the Internet at high speeds.
Overall grade: B+



E-WORLD

(800) 775-4556

Begun in June, E-World (a unit of Apple Computer, Inc.) targets devotees of Apple products.
Cost: $8.95 per month buys two hours, after which use is billed at $4.95 per hour. A promotion through February offers 10 free hours.
Access speed: 9.6K bit/sec. with plans for 14.4K bit/sec. in the first quarter.
Internet strategy: Support for Internet E-mail; Usenet newsgroups will be available sometime in 1995.
Interface: E-World's front end is its strongest feature. Users are presented with a highly graphical, logically organized "city" in which locations (buildings, newsstands, etc., are the doors into services). The software is now exclusive to the Macintosh, but a Windows version is expected in 1995.
Population: Not provided.
Overall grade: Too early to tell.



INTERNETMCI

(202) 887-2442

Already a major carrier of Internet traffic, MCI Communications Corp. in November announced plans for InternetMCI, a service with its own client software. Available in January, InternetMCI will offer a portfolio of informa-

tion, shopping and news services via its own service, MarketplaceMCI.

There is a onetime access charge of $18.95 and $19.95 per month for seven hours of use. The installation cost is $300 per circuit for dedicated access; monthly port charges range from $1,000 for 56K to 64K bit/sec. to $2,300 for T1 speed (1,536K bit/sec.).

Access speed: For business customers, MCI will offer access speeds ranging from 9.6K bit/sec. all the way up to Asynchronous Transfer Mode (ATM) running at 45M bit/sec. Dial-up speeds are 14.4K and 28.8K bit/sec., with plans for ISDN in 1995.

Internet strategy: Support for Internet E-mail, a listing of Web pages, shopping from electronic storefronts.

Interface: MCI's client software is derived from Netscape, a graphical Internet browser from Netscape Communications, Inc. (formerly Mosaic Communications, Inc.).

Population: Not available.

Overall grade: Too early to tell.

INTERNET

Contact any of the many local and national Internet access providers.

Cost: Dial-up access to the Internet comes in the following two flavors:

- A shell account, in which a user signs on to an Internet access provider as a terminal. Prices for limited-use shell accounts are as low as $10 per month.
- A Serial Line Internet Protocol or Point-to-Point Protocol interface in which the user's PC has its own unique IP address on the Internet. These connections permit use of graphical browsers such as Mosaic.

Internet software ranges from free to $200 and access deals for 14.4K bit/sec. cost as little as $25 to $30 per month for unlimited access.

Access speed: Mosaic requires a minimum 14.4K bit/sec. modem. A few Internet providers plan to offer ISDN Basic Rate Interface (64K bit/sec.) support and vow to price it close to what 14.4K bit/sec. costs today.

Interface: A plethora of software is now available that establishes the required TCP/IP stack on your PC and provides Internet utilities such as FTP, Telnet and gopher.

Population: Estimates vary from 25 million to 30 million.

For IS professionals: Many IS professionals are finding much of what they need on the Internet. The key here is "finding." Riches are often buried, known only to the experienced few. The best advice is to ask for advice. New users should also subscribe to the appropriate list servers and Usenet newsgroups and scan them often for information.

Keeping up with Web developments is more difficult because these multimedia-capable servers are growing by 200 sites per week. The best source of information on new Web sites is the National Center for Supercomputer Applications' What's New home page (http://www.ncsa.uiuc.edu:80/sdg/software/mosaic/docs/whats-new.html).

Overall grade: B+ ✦

Skills for an On-line Age

Interconnected networks will create demand — and opportunity — for people with the right training

By Jodie Naze

Job descriptions are still fuzzy and duties overlap in the on-line age, but that's expected to change.

As use of the Internet and other on-line resources shakes out, roles and responsibilities will become more defined. For now, the following jobs are taking shape:

Internetwork engineers

The number of users wanting to use TCP/IP is expanding much faster than the number of people who understand it technically. "Even prepackaged IP software occasionally needs specialized configuration," says John Quarterman, a founding partner at Texas Internet Consulting in Austin.

Internetwork engineers often handle a variety of tasks, such as setting up prepackaged dial-up software, customer support for service providers and design and installation of networks and applications.

"People who can grasp the broad requirements of a WAN and still relate it to the specific user requirements to provide connectivity at the desktop will fare well," says Greg Musat, information systems recruiter at AJM Professional Services in Troy, Mich.

Security experts

Most of the responsibility for security will fall into the laps of current IS staff, Quarterman says, but firms wanting a higher degree of protection will continue to hire experts.

Hugh Watkins, a systems engineer at Delta Air Lines in Atlanta, for example, is heavily involved with Internet security. "We want to be careful that we don't let people [access] our internal network from the Internet," he says.

"Careful" means building a firewall machine between Delta's internal network and the Internet and configuring and setting up domain names. In addition to intensive amounts of logging activities, the job requires a heavy Unix and networking background. "You must have the ability to diagnose TCP/IP problems as well as Unix configuration problems," Watkins says.

Mobile computing technicians

While support staffs wait for the needs of mobile users to become more like those of local users, there will be opportunities for experts in remote access, says Cheryl Currid, president of Currid & Co. in Houston.

Necessary skills include an aptitude for various dial-up and wireless telecommunications options and procedures, troubleshooting hardware problems over the phone and developing scripts to automate dial-up and log-in procedures.

Internet specialists

These experts help companies creatively use the Internet to meet business needs and project the business onto the Internet.

To fulfill this role, job candidates must be able to build World-Wide Web pages and have the capacity to monitor news groups and disseminate information. "Not only should they be able to skillfully retrieve information from the various news groups, but they must also be able to put quality materials onto the Internet," says John Makulowich, vice president of The Writers Alliance, Inc., an Internet training and educational writing firm in Gaithersburg, Md.

Experience with resources such as the World-Wide Web, knowledge of navigation techniques including gopher, Telnet and Mosaic, and familiarity with Unix is critical.

Information librarians

Cyberians use computers to get into and seek information from on-line services. Required skills include experience with navigation techniques including gopher, Telnet and Mosaic; expertise in the DOS/Windows PC environment; and in-depth knowledge of electronic searching techniques, especially textual databases.

> WANTED: Internet specialists. Experience with World-Wide Web, knowledge of navigation techniques including gopher, Telnet and Mosaic and familiarity with Unix required.

Trainers

Trainers of on-line resources, especially the Internet, are in demand. "It's an entrepreneurial phenomenon," Makulowich says. Skills required include a knowledge of the various on-line services, the ability to simplify complex concepts and a knack for standing in front of a class.

Wordsmiths/graphics specialists

Companies that want an established Web presence will need people who can present information graphically and create readable documentation. ✦

LEGENT.

The war is over. No more howitzer shells

coming at client/server groups from the glass house. No more client/server people lobbing grenades at the MIS staff. Not that peace is always as peaceful as you'd like it to be. Networks going down, bottlenecks popping up, people screaming about applications they can't get to. And a nasty feeling that nobody is really doing anything to help you with any of it. When, in reality, all of us at Legent are doing quite a lot. We've put together the most extensive set of industrial-strength, distributed systems management tools available. We've also developed an open architecture called XPE™ that lets our software work together across almost anything you can wire together, regardless of function or platform, from mainframes to UNIX servers to PC LANs. Which means you can manage your systems from the platform of your choice, something our customers tell us they're happily doing right now. It's not a silver bullet, but it can definitely help you do your job better. Besides, it's peacetime. Who needs bullets?

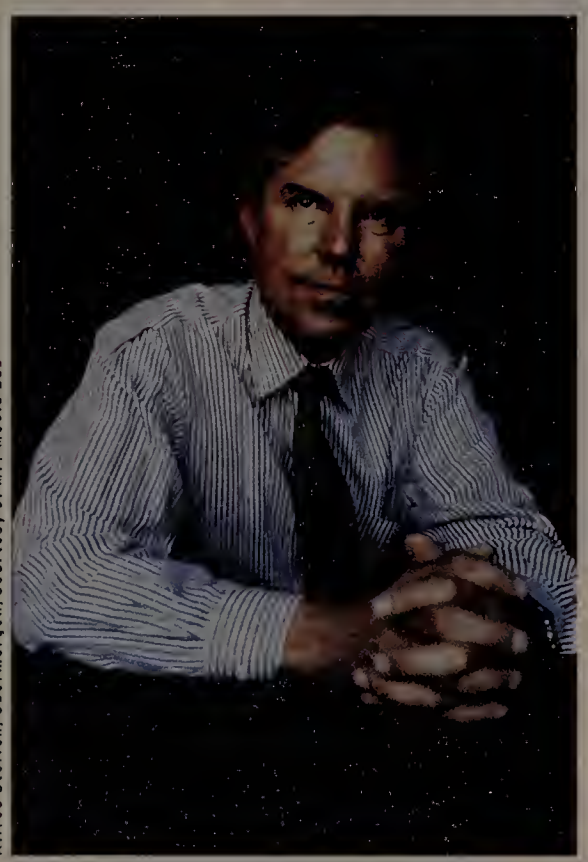
Legent products and services help you manage practically every aspect of your systems, networks, databases and applications in a multi-platform environment. For a faxed capabilities overview call 1 800 676-5468 x 2503.

THE FIVE MILLION CHANNEL MAN

The Internet will be bigger than anyone imagines

Much of the technology that will show up on the information highway tomorrow is being done at the MIT Media Lab today. Nicholas Negroponte, the lab's globe-trotting director, recently took time out for a virtual interview with *Computerworld*'s senior editor William Brandel over the Internet.

COMPUTERWORLD: There has been phenomenal growth in usage on the Internet in the past year. Yet the Internet has been around for years. What can the Internet allow people to do today that they could not do, say, a few years ago? Why all this growth now?



Alfred Steffen/Ubermorgen/Courtesy of MIT Media Lab

NEGROPONTE: Let me start by saying that I think the Internet is one of the rare, if not unique, instances where "hype" is accompanied by understatement, not overstatement. I estimate that the 'net (or whatever it is called) will have 1 billion users by the year 2000. I don't think we know what has hit us.

Exponential growth in PCs has now created a critical mass that was missing as recently as three years ago. In 1990, companies such as IBM and Apple looked at the home market as a nonmarket. Today, almost 70% of all PCs are being shipped into the home.

As Andy Grove [chief executive officer at Intel Corp.] points out, in two years we make as many computers as existed in all preceding years. We really don't understand exponentials clearly. It's like working for a penny a day at the beginning of January and doubling your salary each day for that month. You are earning more than $10 million on the last day. That is what is happening with the 'net: We're in the equivalent of the last days of January.

The 'net is not about information providing. It is about community. Without the current presence of computers in the home, this community just did not exist.

COMPUTERWORLD: Is the Internet the information superhighway? Should it be?
NEGROPONTE: Whether or not the current Internet *is* the information superhighway or not is less important than the fact that it *is* an excellent model for it. This is true in the following three ways:

- It has no centralist control.
- It has scaled well (so far).
- It does not know you are a dog.

There will need to be all kinds of verification, privacy and digital cash invented for the 'net to be used as a real "highway" (awful word). But that will happen rapidly.

COMPUTERWORLD: Is all the hype surrounding the Internet good for it? Are there downfalls?
NEGROPONTE: The hype is just fine. Whether the hype comes from an enthusiastic vice president or "the media," it raises the public's awareness of a new medium. The 'net has many harmonizing and decentralizing propensities that are just great.

Multiuser Dungeons [MUDs] and object-oriented MUDs are an example of a new form of entertainment (sometimes called a "third place"). I believe more people will be entertained by the 'net than by looking at "network" television by the year 2000. Odd how the "networks" used the word "network" so badly.

COMPUTERWORLD: There has been a spike in the user population on the Internet recently. Yet there does not appear to be any centralized control or method to the madness, if you will. Is there some controlling mechanism that is not apparent? If not, what are the implications of the random growth on the Internet?
NEGROPONTE: The growth is no more random than a flock of geese, where no goose is in control. (Most people think the lead goose is guiding; it is not). See Mitchel Resnick's book, *Turtles, Termites and Traffic Jams* [MIT Press, 1994]. This is good, not bad.

The part that feels like "madness" is the economic model, which none of us understands clearly. It calls into question the advertising model of entertainment that is considered so fundamental to TV but is absent in books, for example. [Futurist] George Gilder is fond of calling books a medium "of choice," and he is right!

COMPUTERWORLD: Should business look at the Internet as a medium for commerce? Is it possibly a hostile environment for business? Does it offer the profit yield that some companies are reaching for?
NEGROPONTE: Of course business should look at the 'net as a medium for commerce. This is particularly true if you make bits, not atoms. The 'net is neither hostile nor friendly, as much as it changes the rules.

All of a sudden, little companies can behave like big ones. Being large has less commercial advantages than it did before. Intellectual property changes meaning. "Out of print" no longer exists. And on and on.

COMPUTERWORLD: What will we be able to do five years from now on the Internet? Home shopping? Download movies? Interactive video? Five hundred channels? Home security?
NEGROPONTE: All of the above and more; not 500 channels, but *5 million*. The way to think about the 'net is to compare it with the technologies of "push" as we know them today in newspapers, magazines and television. The 'net will be the technology of "pull" tomorrow, where people reach into it or have their intelligent agents do so on their behalf. Today, this is manifest by browsing tools. Tomorrow it will be agentry.

COMPUTERWORLD: Look at what *Wired* has done to make heroes out of people who earlier would have been categorized as "propellerheads" or "geeks." What role has the Internet played in this image transformation? Is this good? Could the media also be lionizing a society that is shying from face-to-face communication?
NEGROPONTE: *Wired* has not made "heroes" out of "geeks"; it has presented a new voice and is recognizing a lifestyle and culture that is transnational, highly generational, more like rock music than Catholicism.

Any electronic medium that removes space and time as serious constraints has the terrific effect of enhancing face-to-face communication. For myself, I find face-to-face communication used for far more important interpersonal relations than before. America could be 50% more productive (whatever that means) if corporations trashed 90% of the meetings they hold. Most of that can be done far better in cyberspace.

RIDDLE: Why is the Internet an excellent model for the information superhighway?
ANSWER: It has no centralist control. It scales well (so far). And it does not know you are a dog.

COMPUTERWORLD: Name two projects in the MIT Media Lab that will be in use in the next couple of years.
NEGROPONTE: There are dozens; here are two. One is Ringo, an agent that helps you select music. This simple program will grow rapidly and be used for books, movies and restaurants. Another is NIF (News in the Future). Already some of the 19 newspaper sponsors of NIF are experimenting with real systems.

COMPUTERWORLD: Do you think the "change in guard" in Washington will impact the information superhighway?
NEGROPONTE: I don't think Washington has much of an effect on the 'net. This is a phenomenon that will grow in spite of regulation and needs no incentives. Government support helps a little and lack of support will hurt a little, but the key word is "little." This is a global phenomenon, not national (the N in NII [National Information Infrastructure] is just silly), fully in play and far beyond any point of return.✦

What the Infobahn Means to Me

CIOs and CEOs respond



Douglas Fields
Vice president of telecommunications
United Parcel Service of America, Inc.
Mahwah, N.J.

The information highway is ...
"... a concept to create a dynamic infrastructure that would be useful for business, citizens and national institutions to conduct their affairs. Physical manifestations might include high-speed linkages between different sources to every conceivable user."
For my company it means ...
"Our strategies are twofold: to use existing technologies to meet our tactical needs and to stay close to the major telecommunications vendors to leverage their services."
In the coming year ...
"I don't think anything is going to happen in 1995. Telecommunications providers are clearly moving in the direction of global networks and capacity on demand."



Tim O'Reilly
President
O'Reilly & Associates, Inc.
Sebastopol, Calif.

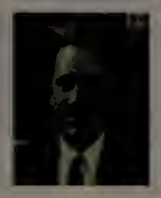
The information highway is ...
"... the present Internet and the way it's developing. There are forces pushing in the direction of centralization, such as the cable companies, but the Internet is a better model because it's distributed, peer-to-peer and ... it creates a free market for information."
For my company it means ...
"I'd like [the information highway] to be a user interface onto news [and information]. We're offering Global Network Navigator to develop voices on news that people can trust.... The Internet is great because it's distributed and solves distribution problems."
In the coming year ...
"The World-Wide Web is the most significant product of the 1990s, and this year we'll begin to see the deployment of secure, encrypted transactions so that people will be able to buy things on the Web.

"I think the Web will be the basis for a whole new industry in much the same way that the PC software industry developed."



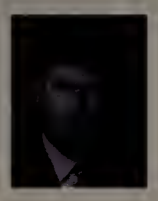
Scott McNealy
CEO
Sun Microsystems, Inc.
Mountain View, Calif.

The information highway is ...
"... everything that allows you to communicate and complete transactions with people remotely ... including the Internet, public and private networks. It's currently all patched together like a freeway system, and there's a lot of repaving going on as we try to make the dirt roads into freeways."
For my company it means ...
"... a huge opportunity [for our] multimedia authoring system and security and authentication. Disney does not want *The Lion King*, for instance, sent out to 30,000 users by some hacker."
In the coming year ...
"The year-to-year changes in the highway will be imperceptible, but the five-year changes will be astounding. It won't be *Beavis and Butthead* on demand driving this but corporations working with other corporations and clients and suppliers."



Steven P. Hansen
Director of information services
The Toro Co.
Minneapolis

The information highway is ...
"... a network and methodology for publicly accessing available information. It's also a network connection to facilitate [on-line] information interchange with business partners that we're using fax and phone services with today."
For my company it means ...
"At the moment, it's an attractive nuisance. People may surf the Internet for long periods of time without keeping the company's best interests served."
In the coming year ...
"The two most common things I hear about are directories of services: what's available and how to get to it. The second issue is security. The misuse of this facility is a big concern of ours."



Robert P. Tabb
Vice president, systems development
Ryder System, Inc.
Miami

The information highway is ...
"... a communications network that is accessible to all kinds of entities, including business, academic and personal."
For my company it means ...
"We're building our own internal network, but we're going to interface with suppliers for purchase orders and the delivery of invoices. We're also building a knowledge base of our customers and prospects from our own databases as well as other services."
In the coming year ...
"Standardization is key. The maturation of frame relay and [Asynchronous Transfer Mode] technologies is going to be absolutely key. We will have to determine how our customers will get access to it."



Craig D. Goldman
Senior vice president and CIO
The Chase Manhattan Bank NA
New York

The information highway is ...
"... There really isn't just one. You have the Internet, AT&T's [forthcoming] services with Lotus' Notes, CompuServe, Prodigy. I could go on and on."
For my company it means ...
"We'll deliver services to customers how they want it, not how we want it. We're [currently] working to identify opportunities for wholesale and retail activities."
In the coming year ...
"The introduction of secure networks will allow us to depend upon the capacity, performance and security of transactions flowing over the information highways. The amount of quality resources being thrown at this will help speed it up."



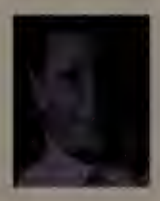
Charles Wang
CEO
Computer Associates International, Inc.
Islandia, N.Y.

The information highway is ...
"... a tool we can use to communicate among ourselves as well as with clients. It's not just a hacker's tool and has become much easier to use with the advent of Mosaic."
For my company it means ...
"The speed with which you can communicate and get information is one of the biggest benefits. But you want to be better able to filter information so you don't spend all of your time looking for it. [One thing] CA will [focus on is] security systems management."
In the coming year ...
"The advent of Mosaic will increase the volume of the Internet dramatically — overnight. People will begin to build business applications and tools that really use the information highway."



Peter R. Tittler
Vice president, networks and technology
Avis, Inc.
Garden City, N.Y.

The information highway is ...
"... any external network connection that allows people to tap into any number of on-line services. I don't view it as one specific network. It's really universal connectivity where anyone can get to anyone."
For my company it means ...
"... we can benefit by having our customers contact us directly through E-mail [instead of by fax or phone] if they're trying to rent a car or register a complaint."
In the coming year ...
"We will hit critical mass in the number of people hooked up to the information highway. I want to be able to get to all of our suppliers, and just as many of our customers will want to be able to reach us."



Larry Ellison
CEO
Oracle Corp.
Redwood Shores, Calif.

The information highway is ...
"By combining all information in digital form, and making it available everywhere, the information highway will utterly change our lives."
For my company it means ...
"Oracle is laying the foundation for the information highway with companies such as BT, Bell Atlantic and BellSouth by providing the enabling technology to deliver interactive information services to customers."
In the coming year ...
"BT has already turned on interactive services to the home and will expand to 2,500 homes in mid-1995. Approval of pending installations is dependent on regulatory approval, and we hope to see that in 1995."

Compiled by Thomas Hoffman and Melinda-Carol Ballou.

In Database Technology, Mission-Critical Has Been Mission Impossible.

Until Now. Introducing CA-OpenIngres.

CA World '95, July 16-21, 1995, New Orleans. Call 1-800-CA-INFO95 For Information.

CA-OpenIngres. Advanced Technology. Mission-Critical Experience.

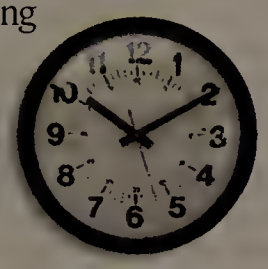
While other companies promise database technology you can trust for mission-critical client/server applications, only one company delivers.

- Total Replication
- Transparent Gateways
- Client/Server
- Open Architecture
- Fully Scalable
- Object Relational DBMS
- Dynamic Triggers
- 24/7 Support

Computer Associates. With the introduction of CA-OpenIngres®, we've combined the industry-leading technology of OpenIngres with our own unmatched experience in mission-critical heterogeneous computing.

It's a combination that turns the dream of global, enterprise-wide information management into reality. A feat CA-OpenIngres accomplishes by combining the robustness of classic production systems with the economy and flexibility of open systems.

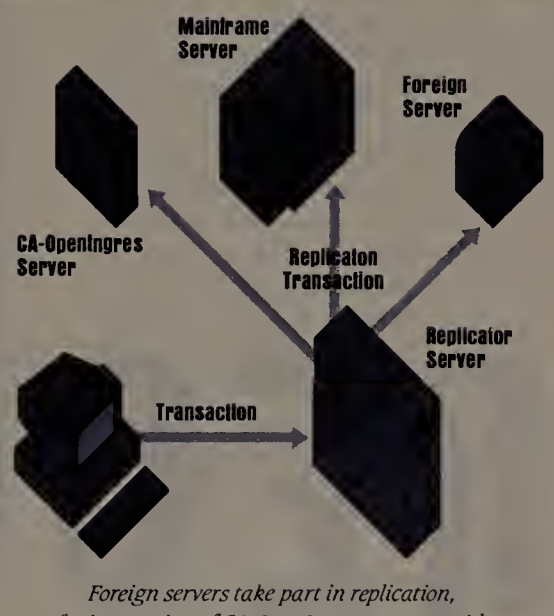
The result is a single, logical view of disparate data whether it be relational, non-relational, local or distributed.



Computer Associates offers 24 hour/7 day a week service and support.

And with our leading-edge Object Management Extensions, you're not just limited to text and numbers. OpenIngres allows you to develop your own business data types like times, dates, audio, video and other multimedia.

What's more, now that OpenIngres is CA-OpenIngres, product support will never be in doubt. Because Computer Associates is the only database company that includes technical assistance 24 hours a day, seven days a week standard, at no extra charge.



Foreign servers take part in replication, for integration of CA-OpenIngres systems with existing production systems.

For More Information On The Advantages Of CA-OpenIngres, Call 1-800-225-5224, Dept. 12102.

CA-OpenIngres. In database technology, mission-critical is now mission accomplished.

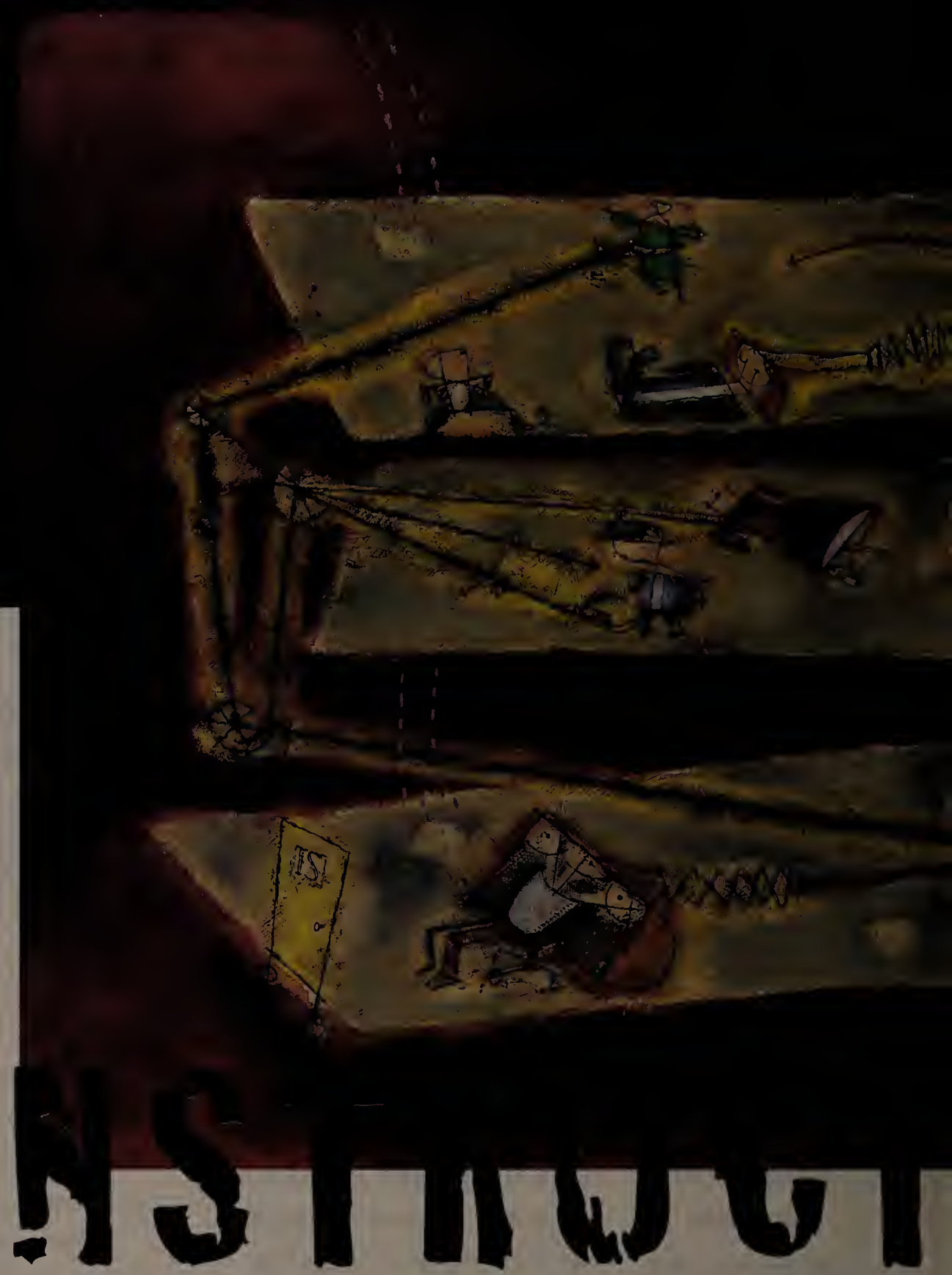
COMPUTER® ASSOCIATES
Software superior by design.

UNIX VMS NETWARE OS/2 WINDOWS NT

© Computer Associates International, Inc., Islandia, NY 11788 7000. All products referenced herein are trademarks of their respective companies.

Re-engineering IS

It's all about change in IS these days. Client/server is sweeping away old skill sets and bringing applications ever closer to users. Business pressures are forcing some IS organizations to break up and decentralize, while cost concerns are sending others in the opposite direction. In the absence of simple solutions, here are some thoughts from the thinkers and the practitioners about what makes a great IS organization these days.



RECONSTRUCT

Client/server technology is remaking IS groups everywhere. A few solid techniques can help keep a roof over your head while you build a new foundation.

By Joseph Maglitta

It's no secret that the glass house in many organizations has been shattering for more than a decade. Yet as the new year dawns, many large and medium-size information systems departments still face a major challenge: how to avoid getting cut to ribbons by shards from the distributed computing explosion — especially with client/server systems.

Like any major renovation, building with client/server technology invariably produces dislocation, noise, dirt and lots of cursing. The new floor plans may seem strange and confusing long after the dust has settled. And like most construction, it's expensive, and it always costs more than planned.

Unfortunately, there's no universal blueprint for constructing a safe IS structure to support client/server systems. Because of differences in budgets, history, skills and vision, one company's dream house is another's cabana. So how do you keep the roof from collapsing over your head while you learn new building techniques?

According to organizational architects and distributed systems builders, buying off-the-shelf software whenever possible is a good idea. So is knowing when existing applications should be demolished or merely redecorated using "screen scrapers" or graphical user interfaces. But for client/server to work, experts agree, IS must also swap its hard-hat mentality for an open mind and warmer handshake.

Beyond that, consultants say a handful of simple principles will provide a solid foundation for IS groups trying to reorganize around nontraditional computing models.

• **Draft your own plans.** Many client/server projects are handled by IS-led teams in business units. But experienced hands say any client/server effort, like any sound technology initiative, should reflect your company and its IS structure, not some prefabricated ideal.

Say you're a highly centralized, technologically conservative firm that values efficiency



Ferruccio Sardella

over innovation. Chances are nearly zero that you'll get very far selling management on a big, dispersed client/server program.

Instead, says Steve Guengerich, president of the educational division at BSG Corp., a Houston-based systems integrator, shoot for a quick-hit initiative to demonstrate the return on investment of client/server. You can then expand on that success, he says.

> Unlike mainframe jobs, client/server applications are meant to be changed. Your chances of success will be greater if you notify business clients from the start that work crews will be permanently on site.

Consultants say whatever structure you choose should allow for frequent user feedback and idea swapping among developers. Consider creating a small, centralized unit to facilitate sharing of project results, especially failures.

• **Build learning into the structure.** You may be solid today, but what happens when the next wave of newfangled development technology hits the market?

To avoid becoming obsolete, build just-in-time training, mentoring programs and other long-term educational tactics into your efforts, says Bert Rubenstein, president of Cambridge Technology Partners in Cambridge, Mass. "Many organizations say, 'Oh my gosh, the mainframe is dead; client/server is here,' and they're hot to train everyone. They rush everyone through training and end up with a whole generation of people with mediocre skills." Gradual, phased, continual learning is better, he says.

And pay extra attention to negotiation, facilitation, user partnering and other "soft" skills. Often these skills — and not technology — will make or break client/server projects.

What if IS staffers aren't willing or able to help build a new organization? Bill Zeitz, president of New York consultancy Zeitz and Associates and former IS director at American Cyanamid Co., has a simple approach. After providing a fair chance to change, he advises: "Give them a handshake and show them the door." However, he and others say that with some client/server applications running up to a million lines of code, there will always be room for professional application developers who understand areas such as documentation and maintenance.

• **Hang a work-in-progress sign.** Unlike mainframe jobs, client/server applications are meant to be changed. Your chances of success will be greater if you notify business clients from the start that work crews will be permanently on site.

"Don't think about the beginning and end of the project," says Judith Hurwitz, president of Hurwitz Consulting Group, Inc. in Watertown, Mass. "You have to look at it as an interactive process." Pretend you're a software company, not an IS department, she advises. "Then you can say, 'This is Version 1.0 of the product.' "

That kind of flexibility lets IS turn on a dime as the business changes, Hurwitz explains. "Then you can be proactive and ask, 'How can we keep evolving this project?' "

Whatever your development structure, experts agree that project teams must contain the proper mix of IS staffers and businesspeople.

• **Hire subcontractors.** Used properly, outside systems integrators and client/server developers can help companies do a faster, better job than many do-it-yourselfers. Just make sure your contract has a no-solicitation clause that prevents vendors from hiring away your stars.

If you do hire outsiders, "be careful not to demoralize IS staffers," cautions Wick Keating, director of client/server computing at American Management Systems in Arlington, Va. Sooner or later, techies will hit the road if you don't provide them with chances to work on more glamorous projects.

Conversely, if you outsource legacy maintenance so your staff can focus on client/server, be realistic about how much time you'll save. "You can't wash your hands completely," Keating says.

• **Bring extra cash.** Client/server technology may trim IS spending but probably not any time soon. Experts say to expect a spike of 2% to 30% of your current technology budget. The reason: higher salaries, bigger operating and development staffs, training expenses and the need to run old and new systems simultaneously.

At American Cyanamid, a modest initial move to distributed computing added "a couple of million" dollars, or about 20%, to IS costs the first year alone, including training, software and networking, Zeitz says.

It's possible to shorten the duration of the spike by aggressive training (see story page 46). But there's no getting around it: While costs-per-function may eventually drop, actual costs probably will not. Moreover, growing user expectations and system complexity will continue to drive up costs.

In the end, savvy architects of both buildings and information systems discover there are few rules — only solid building blocks. Ultimately, company attitude, not organization charts, will probably determine if your client/server projects get built up or condemned. ✦

STROKES

An insurance company and an acquisitive bank prove there's more than one way to skin the re-engineering cat

DIFFERENT

Community Mutual Insurance Co.

By Ed Scannell

Last year the IS department at Community Mutual Insurance Co. in Cincinnati was under fire.

The company's nine business units and two subsidiaries were complaining about the information systems department's lack of response to their demands for internally developed applications and support.

Puzzling over the solution, the department faced the classic conundrum of whether to centralize or decentralize its application development and support functions.

"A centralized organization, if it is run well, can give you maximum efficiency through economies of scale," says Bill Eager, Community Mutual's senior vice president and chief information officer. "However, it may not be the most effective way because you can lose touch with the business priorities."

The department decided to sacrifice economies of scale in order to more effectively meet its business units' and subsidiaries' application needs. It took about 200 of its central development staff and split them up among the 10 development groups, each of which focused on supporting one strategic business unit.

The results have been positive on several fronts.

First, applications are being developed in a more timely manner because several development projects can now proceed simultaneously at the various units and not be logjammed in central IS. Second, the fact that the general managers of the business units have a greater sense of control and empowerment over their own development projects has helped improve the relationship between the units and IS.

General managers "now feel they have a set of systems resources they could budget for. They also feel they have a right to expect that group of folks to work specifically on their problem and not have to fight with other divisions for their time," Eager says.

Some snafus

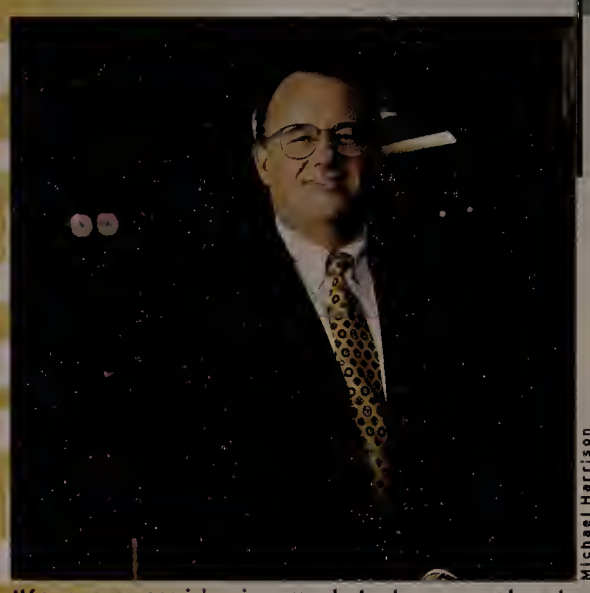
The decentralization, however, has not been without flaws. In fixing some old problems, the IS department discovered it was creating some new ones.

For instance, when one development team enhanced a mission-critical application used by a half-dozen or so of the other units, those enhancements, while benfitting its customers, caused major headaches for another division's customers.

"A change made by division A would sometimes severely affect division B. The result would be that those customers [of division B]

First Union National Bank

By Ed Scannell



Michael Harrison

'If you are acquiring in a market where you already do business, the efficiencies [of centralizing] can be as high as 35% to 40%, and maybe 15% when you go into a new market,' Judge Fowler says

First Union National Bank, which has been buying other banks during the past couple of years the way some people collect baseball cards, would have had good reason simply to decentralize its information systems operations.

But as more than a few corporate IS managers can attest, such an approach can prove expensive and time-consuming. Not to mention that customers can become frustrated when data center proliferation delays products and reviewing credit services.

For just these reasons, First Union quickly centralized the data centers of each of the 20 banks it acquired in the past two years, making them compatible with its two permanent data centers in Charlotte, N.C., and Jacksonville, Fla.

Judge Fowler, First Union's director of systems development, has been a guiding force behind his company's decision to centralize the bank's IS operations.

The rapid conversion and integration of the acquired banks' information centers differs radically from that of, say, Banc One Corp., where the IS departments of acquired banks are kept separate. In the past, Banc One has worked as a loose alliance of franchises where each group retains its own independence, although it has backed off from that philosophy somewhat and has been consolidating some of its banks back into a centralized system during the past year or so. But Fowler says he believes the advantages of his approach will be borne out.

Centralizing IS, Fowler says, can result in a significant reduction in the number of administrative and support people, as well as those responsible for writing procedures and reviewing credit practices.

"If you are acquiring in a market where you already do business, the efficiencies [of centralizing] can be as high as 35% to 40% and maybe 15% when you go into a new market," Fowler says.

Systemwide implementation

Another major advantage to First Union's approach is significant savings when developing a new product, the same version of which can be rolled out to all the acquired banks. In a more decentralized system, that same product might have to be adapted several times to custom-fit each bank's IS department.

"If you are rolling out a new deposit product but you have 20 different deposit systems to deal with and you also choose to make it an enterprisewide [product], you have to physically

would get a notice that was irrelevant, or maybe a claim was calculated incorrectly," Eager explains. "And division A would carry on not knowing what havoc they caused."

In response, Eager and his IS team had to recentralize the one or two application development functions that served most of the company. "We reeled some of that back in and recentralized support for some of those core systems where we have multiple divisions using them," Eager said.

User rapport is key

What has made managing the decentralization process easier was Eager's decision to immediately establish a relationship with each of the business units when he came on board a year ago. Being Community Mutual's third CIO in just four years, Eager believed clear communication with his peers had to be established if the IS reorganization was going to work.

"This is an organization that had held its [information technology] group in such low regard that it lost its clout with the rest of the company. Consequently, the previous CIOs were getting churned up among the various user groups," Eager says. "So I have taken the time to explain what I am doing, why I am doing it and why it is important to be done."

THE DEPARTMENT DECIDED TO DECENTRALIZE AND SACRIFICE ECONOMIES OF SCALE IN FAVOR OF MORE EFFECTIVELY MEETING ITS BUSINESS UNITS' AND SUBSIDIARIES' APPLICATION NEEDS. APPLICATIONS ARE BEING DEVELOPED IN A MORE TIMELY MANNER BECAUSE SEVERAL DEVELOPMENT PROJECTS CAN PROCEED SIMULTANEOUSLY AT THE VARIOUS UNITS.

Eager says he has made a career out of fighting fires — going into troubled IS organizations, identifying and solving their problems and then moving on to a new challenge every few years.

"I do turnaround. I go into an organization for five or six years, fix the problems, get bored, and when the recruiter calls, I go off and do it again. [Community Mutual] is the third time I have done this," Eager says.

Even with open lines of communication, one of the most difficult challenges is getting multiple divisions to work on a joint project where each is responsible for a specific contribution.

The central IS team still has to referee squabbles where one unit's preference for programming tools or a particular development approach conflicts with another's. Eager says he curbs such bickering by keeping a tight rein over product standards as well as a strict review and approval process. "It is almost like the prime minister in England, where you have to pull together a coalition of five different parties and hold it together long enough to complete the task," he remarks.

Eager acknowledges that Community Mutual has not saved any money by decentralizing development. That does not mean, however, that upper management does not want to see some productivity return on its $50 million IS budget investment.

"I think [decentralizing application development] has more to do with devoting resources to different sections of the business and giving them a sense of having more control so they can move ahead," Eager says.

In what Eager describes as a "merger of true equals," Community Mutual last month signed an agreement to merge with The Associated Group, the Blue Cross/Blue Shield licensee for Indiana and Kentucky.

The Associated Group currently maintains separate IS centers for Indiana and Kentucky, and both groups appear to have taken a decentralized approach to their respective business units. But because the merger is not expected to be completed for another nine months, Eager adds that it is too early to tell if each IS center will continue to operate autonomously.

The decision of both companies to distribute IS operations was not a major factor in their merging. "I haven't gotten inside our CEO's head to see how seriously they have considered the [information technology] side of things. But I believe the market synergy and the opportunity to put together an integrated health care [system] on a broad regional basis is the primary motivator," Eager says.✦

---

build and test it 20 times and offer customized documentation 20 times," Fowler says.

Fully understanding Fowler's strategy, however, hinges on understanding standards. One major advantage to being committed to standards is not having to swap in and out thousands of copies of a desktop operating system or server every other year as one competitor's products supersede another's.

"Once you have a standard where 80% to 90% of something is entrenched, you are better off staying with it because of the way companies like IBM or Microsoft will continue to leapfrog each other with technology," says the 27-year IS veteran.

Besides avoiding the torture of swapping competing hardware and software products in and out, standards have also made it easier for First Union to negotiate longer-term contracts with vendors. That serves to reduce internal development and user training costs while speeding product and service rollouts across all the acquired banks.

One new project expected to be rolled out early next year will allow loan officers to go into the field to begin the loan processing process on their portables. They will be able to send various documents back to the home office, where they will be automatically routed to workers who complete several different functions as part of processing the application.

"We had to put together a blueprint for the infrastructure for the delivery of systems and products to customers," says Jeff Scott, assistant director of enterprise architectures at First Union. "We believe that once you have the infrastructure in place, you can build products on top of it as you identify various application needs."

Currently, that infrastructure consists of five Amdahl Corp. 3090-class mainframes, which run the two data centers. Those systems run IBM's DB2 and IMS databases as well as IBM's CICS transaction monitor. The bank also has about 150 NetWare 3.x servers from Novell, Inc., all running on uniprocessor 486-based servers mostly from Compaq Computer Corp.

Big iron retention

Centralizing so many information centers has meant a continued reliance on the company's five mainframes, something Fowler and his team see continuing for the rest of this decade.

Although mainframes are decidedly unhip these days, they have proved invaluable as the bank has smoothly brought on board so many information systems spread out over eight southern and mid-Atlantic states.

BY CENTRALIZING IS, COMPANIES CAN SIGNIFICANTLY REDUCE THE NUMBER OF ADMINISTRATIVE AND SUPPORT PEOPLE AS WELL AS THOSE RESPONSIBLE FOR WRITING PROCEDURES AND REVIEWING CREDIT PRACTICES. ANOTHER MAJOR ADVANTAGE IS SIGNIFICANT SAVINGS WHEN DEVELOPING A NEW PRODUCT, THE SAME VERSION OF WHICH CAN BE ROLLED OUT TO ALL COMPANY UNITS.

"I am not particularly interested in getting rid of mainframe applications like IMS with something like 20 million lines of mainframe code to support," Fowler says. "Besides, I have never lost a minute of sleep with MVS. In 27 years, I have had only one problem that took more than 12 hours to fix."

Besides providing a certain peace of mind, mainframes also provide greater security and control over the banks' data. Fowler says none of the distributed strategies his team evaluated compared favorably to the sort of security that mainframes provide. "All customer data is in the mainframe and secured there. We don't even allow the replication of data out of the mainframe to distributed sites," Fowler says.

But while First Union will continue to depend on mainframes, it is not blind to the opportunities client/server can provide. With about 36,000 employees and a little more than 15,000 PCs spread among its sites, First Union has rolled out more than a dozen client/server-based products and services.

"We can see the technology wave coming, and we are getting ready so users can surf it," Scott says. First Union anchored the bottom end of its client/server strategy on IBM's OS/2 on the desktop, fighting off periodic temptations to switch to Windows.✦

OUT OF THE BUNKER

Lean budgets and mounting workloads are prompting a new partnership between IS departments and former outsourcing foes

By Craig Stedman

Vendors of outsourcing services and information systems departments may never be the best of friends. But the complex and costly transition to client/server environments is pushing IS to drop its defenses, come out of the bunker and seek some help from the once-dreaded barbarians at the gate.

With technology changing at warp speed, outsourcing is not just for the chief financial officer anymore. It also does not necessarily mean turning the lights out on IS. Selective outsourcing of some — but not all — IS functions has become a socially acceptable way of keeping up with technology while retaining control over much of the operation.

"I just see these people as an extension of my own department," says Mike Applegate, network services manager at FoxMeyer Health Corp., a $5.5 billion pharmaceutical distributor in Dallas that recently outsourced its LAN operations and PC help desk to Hewlett-Packard Co.

To be sure, the promised land of reduced costs remains a strong selling point even for selective outsourcing in an era of corporate downsizing. But in a survey last year by Dataquest, Inc. in San Jose, Calif., the need for outside expertise topped the list of reasons why outsourcing customers look beyond their own data center walls.

"Cycle time is very important, and hiring and training [staff] people is the antithesis of a fast cycle time," says Robert Brown, senior vice president and chief information officer at FoxMeyer.

FoxMeyer hopes to make a complete escape from its IBM and Unisys Corp. mainframes just 18 months after it began a client/server systems development project early last year. The project had an accelerated schedule that would not have been feasible without the outsourcing arrangements, Brown says.

"We've saved a little bit of money, but more importantly, our ability to respond [to technology or business changes] has increased," says another IS executive whose company has outsourced pieces of its IS operation to two vendors. "We can scale up and scale down more quickly than before," added the executive, who asked not to be identified.

Selective outsourcing "allows you to rid yourself of some things that are time consuming and take you away from what your real job is," says Linda Mainord, president of the IBM-oriented Guide International Corp. user group and manager of application services for the Memphis city schools.

The Memphis schools have been outsourcing PC installation and configuration for the past year after realizing that there were not enough internal IS staffers to go around, Mainord says. Network support is another task "I would love to have someone take off my hands," she adds.

Some vendors, most notably HP, are building their strategies around selective outsourcing. Dataquest projects that both network and desktop outsourcing will grow at faster rates than data center deals. "The things that are most visible are the big mega-outsourcing deals, but there's an increasing need for more of a task-oriented outsourcing," says Allie Young, a professional services analyst at Dataquest's Framingham, Mass., office.

Meta Group, Inc., a consultancy in Stamford, Conn., has been beating the selective outsourcing drum since 1991 and got "a lot better reception [from IS departments] this past year than we did in the previous two years," noted Chris Byrnes, program director for services and systems management strategies.

"The leading-edge accounts with client/server applications have learned their lessons," Byrnes says. Wholesale outsourcing "is not appropriate for most companies" because of the strategic importance of IS, he added. On the other hand, few IS organizations have sufficient staff to support the staggering growth of PCs and desktop applications.

FoxMeyer has no intention of ceding control over the parts of IS that it considers "strategic or proprietary," Brown adds. The company is retaining all application development plus ownership of data, security systems and its mainframe data center, he says.✦



Dan Bryant

FoxMeyer's Robert Brown (top) and Mike Applegate say outsourcing has reduced cycle time

IS ARCHITECTS FOR HIRE

ANDERSEN CONSULTING
1345 Avenue of the Americas
New York, N.Y. 10105
(212) 708-8309

Service director: Bill Stoddard
1993 re-engineering revenue: $350 million
Re-engineering revenue as percent of total service revenue: 12%
Industry strengths: Strong in most industries
Key clients: Conrail, AT&T, Sanofi Winthrop Pharmaceuticals, Commonwealth Edison
Number of re-engineering consultants: 3,000+

Andersen's "Value-Driven" methodology works to transform IS from being reactive to proactive through its five core competencies: formulating business and operational strategies, redesigning business processes, managing change, architecting information technology and managing complexity.

CSC CONSULTING GROUP
5 Cambridge Center
Cambridge, Mass. 02142
(617) 492-1500

Service director: Jerry Loev
1993 re-engineering revenue: $130 million
Re-engineering revenue as percent of total service revenue: 11%
Industry strengths: Aerospace, distribution, government, manufacturing, retail, telecommunications, transportation, utilities
Key clients: Amoco, Bell Atlantic, Hallmark
Number of re-engineering consultants: 250

CSC Impact, the IS re-engineering arm of CSC Consulting, uses the following techniques to help IS departments devise and align their strategies with those of the overall business: create information technology architectures to assist companies in their technology acquisitions and deployments, improve systems development processes so applications are built on time and on budget and educate business executives on the business implications of emerging technologies.

GEMINI CONSULTING
25 Airport Road
Morristown, N.J. 07960
(201) 285-9000

Service director: Mitchell Schrudder
1993 re-engineering revenue: $90 million
Re-engineering revenue as percent of total service revenue: 4%
Industry strengths: Oil, gas, chemicals, pharmaceuticals, process manufacturing, telecommunications, consumer durable goods
Key clients: Rolls Royce Motor Cars, Union Carbide, MasterCard, most major regional Bell holding companies
Number of re-engineering consultants: 1,300

Gemini's "Construct" methodology is a unified model that includes business, organization and information technology and accepts that changes in one are immediately reflected in the others. There are five key services of the information management group: the information management strategy group works to align IS strategies with business goals; the effectiveness group analyzes the efficiency of the IS organization; rapid application prototyping and design practices develop working prototypes before decisions have to be made; and delivery integration provides systems integrator skills.

*** Revenue figures supplied by Gartner Group, Inc.**
Compiled by senior researcher Kevin Burden.

WHY IS INTEGRATING YOUR PCs SUCH A PROBLEM?



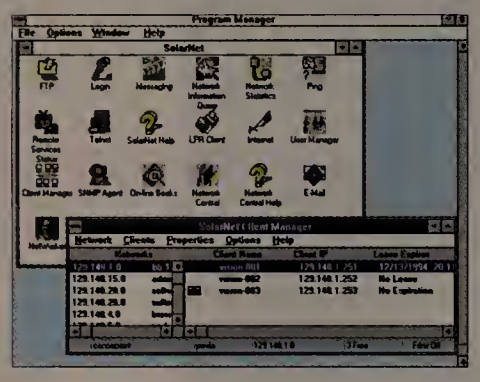
WE HAVE



You see, we have a shortcut through the maze. **I**t's the SolarNet™ suite of PC networking software combined with the Solaris™ operating environment. Together, they provide information to PC users in their local Windows environment—even if the information is scattered across the organization.



SolarNet. The best way to integrate, administer and connect your PCs.



Run sophisticated network applications right from your Windows desktop.

Here's how it works. **S**olarNet is a full suite of PC networking software. Solaris is our powerful enterprise operating system environment. The combination lets you connect multiple LANs with the most popular networking protocols, like TCP/IP and NetWare.® **I**f you're interested in performance (and who isn't), you'll be pleased to know you can count on Solaris to let you harness the power of the new high performance, multiprocessing x86 and Pentium™ platforms. So you can offer network users the capabilities they need to run their favorite databases, like Oracle,® Sybase® or Informix,® or other applications, just as hard and fast as they'll go. **A**nd, because SolarNet is built on the Solaris operating system, your data is always available and accurate, even though it's distributed on multiple systems throughout your organization. **O**ur SolarNet and Solaris combination can even boost the performance of your network managers. It easily integrates into your present environment, so you don't have to replace existing applications, hardware, or people. Thanks to our Windows adminis-



Solaris speaks Oracle, Sybase and Informix, to name a few, fluently.

NO IDEA.



tration, installation and configuration tools, you can make changes to the network quickly, right from a Windows desktop.



Solaris. The best application and database platform.

All of which lowers your cost of ownership dramatically. **I**t also doesn't matter how large your networks are, or how many of them you're managing. SolarNet with Solaris is scalable to thousands of users. **A**nd everyone can have all kinds of access—file, print and resource sharing, even remote access—right from their Windows desktops. And if you need Internet access for your networked PCs, we've got a Solaris server that can handle that, too. **B**ut only if you say so. SolarNet and Solaris both give you stringent data security features, along with the peace of mind that goes with it. Users have the flexibility to access their data from any PC in the network, provided they meet your login criteria.



Solaris and SolarNet. The best combination for all your PC servers.

The solution is a prime example of our experience integrating diverse networked environments. And that makes it a proven foundation for your mission critical applications. We know. We've had to do it for ourselves.



With Solaris as your application, PC network administration, or Internet server, you can successfully manage your entire enterprise.

To learn more about our shortcut through the PC integration maze, reach us at 1-800-SUN-SOFT, or on the Internet at http://www.sun.com/

SunSoft

©1994 Sun Microsystems, Inc. Sun, Sun Microsystems, SunSoft, the SunSoft logo, SolarNet, and Solaris are trademarks or registered trademarks of Sun Microsystems, Inc. SPARC is a registered trademark of SPARC International, Inc. All other products or services mentioned herein are trademarks of their respective owners.

PCIAD

'Reskilling' the WORKFORCE

IS managers find there's no road map for training in the distributed '90s

By Julia King

Ask a dozen information systems managers to identify the thorniest issue associated with re-engineering, and chances are good you'll receive a single answer: training.

Ask the same dozen managers how they're going about training their IS staffs in newer client/server and object-oriented technologies, and you'll inevitably hear 12 different replies. There is no single, proven approach to retraining in this wild new world.

There are two things, however, on which most managers seem to agree:

No. 1: Retraining IS staffers in distributed computing technologies is the only guaranteed way to find people with the skills you need.

"That's because even if you lay everyone off, you're not going to find enough replacement bodies [on the open market] with the right skill sets," says Mark Gregoire, manager of American Management Systems, Inc.'s training services unit in Manchester, Conn.

No. 2: Contrary to a widely held myth that it's difficult, if not impossible, for mainframe developers to make the transition to new technologies, half or more of those who receive the proper training can and do make the jump from highly centralized, host-based computing to decentralized, event-driven computing environments. So says Gene Raphaelian, vice president of industry service at Gartner Group, Inc.'s Santa Clara, Calif., office.

"It's very traumatic for people, and it's a totally different way of doing something. But of the people we have trained so far, not one [mainframe developer] has not been able to make the transition," says an IS director in charge of management production systems at a large national retailer.

Like many other IS managers interviewed for this story, he did not want his firm named for fear of raids on his staff.

"It's pretty brutal out there," he says, referring to the limited supply of IS personnel skilled in client/server and object-oriented technologies in particular. "If people know you have a staff trained in client/server, they'll come after them."

But few companies are training entire IS staffs. Instead, just-in-time training, conducted on the job and on a project-by-project basis, is emerging as the preferred delivery method.

"If you provide training too far in advance of a project, [developers] will never keep that mind-set into the project," explains a senior vice president of IS at a large insurance and financial services firm.

Also, training IS developers in hot new technologies and then failing to provide an immediate opportunity to apply them turns people off, he says. "What happens is you've got them all dressed up with no place to go," he says.

At the opposite end of the spectrum, however, are firms such as Morgan, Lewis and Bockius, a national law practice that is gradually exposing mainframe developers to client/server and other new technologies, with an eye toward eventually reskilling all of the developers.

"We're not doing a baptism by fire," says Donald O. Sternfeld, the firm's Philadelphia-based director of IS. The primary reason is that the firm plans a relatively gradual migration to client/server technologies. But when it does make the transition, it wants IS professionals who know the firm's business, and these are the same people on board now.

> "We have a tremendous investment in our current staff. They know how the business runs. That won't change; just the tools are going to change."
> — Donald O. Sternfeld, Morgan, Lewis and Bokius

"We have a tremendous investment in the current staff. They know how the business runs. That won't change; just the tools are going to change," Sternfeld says.

Teaching, training

Precisely what to teach is another issue, and here, too, IS managers have taken a variety of approaches.

Carolina Power & Light Co. has created a separate systems integration organization that receives highly technical training in communications protocols, application programming interfaces, networking and architectural standards.

Application developers, on the other hand, are skilled specifically in development languages such as Microsoft Corp.'s Visual Basic. The two groups work side by side on client/server projects, says Jay Brown, manager of information technology and standards at the utility.

Other companies have opted to train developers on specific tools, such as the C, C++ and Smalltalk programming languages, rather than provide a broader-based orientation to client/server concepts.

"The advantage of limiting training to specific tools is that it keeps people focused," according to an IS manager who requested anonymity.

Sprint Corp., meanwhile, is covering both bases under a two-tiered training program in which 300 to 400 IS staffers have participated in the past two years, says Mick Hartzell, an educational consultant at the company's University of Excellence in Kansas City, Kan.

At the first tier, they are trained in an internal systems development methodology that is applicable to all client/server projects, Hartzell says.

After that, they are trained on specific tools that will be used on individual projects.

As for the potential of staffing raids, Hartzell says Sprint has "no fear."

"The company is well aware that competition is stiff out there and that people are going to be attracted by other offers. But we really believe we offer employees more than there is on the outside," he says. ✦

NO WAY OUT

Don't cut yourself off at the knees when it comes to training: You'll pay one way or another

By Julia King

Training information systems professionals in client/server and object-oriented technologies is expensive, but having them train on their own costs even more. So says Gartner Group, Inc., which figures that companies with formal training programs spend from $200 to $2,000 per day per IS employee retrained. By contrast, firms that leave it up to staffers to learn on their own end up paying about five times as much, largely due to lost productivity.

"Formal training is absolutely cheaper than on-the-job training," says Gene Raphaelian, Gartner's vice president of industry services. "It also significantly lowers the risk [of failure] on the [client/server] project at hand."

These are among the findings Raphaelian includes in a study titled "Changing IS Organizations: The Effect of Client/Server Implementations on Job Skills Requirements." The study, commissioned in 1993 by the New York-based Open Users Recommended Solutions Group, found "most organizations' training methods are a hodgepodge of on-the-job training, self-training and application-specific training."

What's stopping companies from instituting more formal training programs for client/server environments?

The No. 1 reason is cost or perceived cost, says Mark Gregoire, manager of American Management Systems's training services unit.

"Sticker shock has created a certain amount of paralysis and has definitely stopped organizations from moving as promptly on training as they should," Gregoire says.

Still, for all of the talk about how high costs are, users and vendors both seem to agree that no one knows exactly how much - in dollars and cents - companies actually are paying to "reskill" IS professionals. What clouds the issue is that costs are so widely dispersed, notes Mick Hartzell, an educational consultant at Sprint's University of Excellence.

"When you translate your effort out to the cost side, it gets into time away from the job at hand, the cost of trainers' salaries, the cost of training support people and the capital investment necessary to put the [client/ server] environment in place so people can practice," Hartzell says.

"Because the training environment has to replicate the work environment, to give people an opportunity to practice on the same systems they'll find in the workplace, you start to see a hefty investment of capital dollars."

The bottom line: "When someone says training costs a lot, they're not exaggerating," Hartzell says.



Sticker Shock

Forrester Research, Inc. estimates out-of-pocket costs for effectively retraining developers in client/server skills will approach $1.8 million for an IS organization with 200 developers over the course of the training. The firm estimates that maintaining the new skills will cost about $730,000 annually.

Get Focused

By Allan E. Alter

The cycles with the most impact on IS aren't machine cycles or product cycles. They're business cycles.

And overall, the economic indicators show that the economy has moved over to the upside of the cycle.

Corporate profits rose 39% in the third quarter of 1994, while the unemployment rate dropped to 5.8% in October and the manufacturing capacity rate surged to 85%. Even the Federal Reserve's recent interest rate hikes are a backhanded indicator of the economy's strength. The Fed is worried rapid growth could cause inflation.

If economic history is any guide, companies will not focus primarily on squeezing out costs and improving productivity — the only way to increase profits in declining or sluggish markets. CEOs will want new ways to exploit growing markets and create new ones.

And that modifies the IS agenda.

• **The IS world will have to broaden its scope from cost-cutting, outsourcing and re-engineering.** Pressures will build for IS leaders to grasp strategies, markets and customers well enough to think up imaginative ways to win new customers and keep old customers loyal.



Bill Russell

Take just one industry, agribusiness: Recently, Monsanto provided farmers with Apple Newton personal digital assistants to help them track their use of chemicals and fertilizers. Deere & Co. is piloting tractors that can communicate with global positioning satellites to aid "precision farming." IS departments must focus more on building those kinds of customer-winning, market-building applications.

• **IS leaders will need to stay on top of new technologies to help their companies be market leaders and drivers.** All those mid-'90s trends known as agile competition, mass customization, time-based competition, electronic commerce, on-line multimedia marketing and delighting the customer are enabled through ingenious combinations of new and old technologies.

• **IS management must continue to lower costs.** If you think the time is finally right to ask for that big IS budget increase, think again. Unlike the last expansion in the early '80s, CEOs won't let up the pressure to cut costs during this economic upturn. U.S. manufacturers don't want to give up the ground they've regained from Japanese and other Asian competitors. Re-engineering, total quality management and activity-based costing have shown managers new ways to eliminate hidden costs embedded in business and management processes. CIOs, like the heads of every other function, must continue to cut their expenses.

• **IS executives must manage through triage...** The IS agenda has become more ambitious, not less. The first rule for overburdened managers is to delegate responsibility. IS executives will have to decide which IS functions require close daily attention, which can be safely outsourced to other firms and which can be outsourced in the future. IS executives must invest their time and resources in information technology-enabled business initiatives that require hands-on attention and innovative thinking.

...and lead through more effective partnering. IS managers must make sure vendors and their service providers act like effective partners, holding them to the same high standards a Ford or Toyota would ask from their suppliers. Meanwhile, CIOs must find better ways to work with non-IS management. CIOs still complain that they are left out of business decisions; business management still says IS doesn't understand their concerns well enough. The two sides must negotiate some far-reaching, mutually satisfactory guidelines to govern how to make technology and information management decisions.

The recovery may have widened the IS agenda, but the agenda itself couldn't be more clear. ✦

Alter is a *Computerworld* senior editor, management. He can be reached via the Internet at aalter@ew.com.

Personality PARADE

EXECS TO WATCH



Joseph R. Cleveland
Vice president and general manager of IS
Martin Marietta, Orlando, Fla.

Joe Cleveland is in the middle of one of the biggest mergers in the defense/aerospace industry. The GE veteran will spend 1995 managing the merger of Martin Marietta and Lockheed Corp. in Calabasas, Calif., should it win approval. Presiding over Martin Marietta's Internal Information Systems (MMIIS), Cleveland spent 1994 integrating the IS organizations at Martin Marietta and GE Aerospace.

Cleveland also helped the company save $70 million in 1994 by consolidating mainframes at MMIIS headquarters in Orlando, negotiating new telecommunications, software and maintenance contracts and implementing common back-office systems.

The company looks to Cleveland and MMIIS to showcase its IS prowess to its systems integration and outsourcing customers.

– Allan E. Alter



William F. Powers
Executive director of IS
Ford Motor Co., Dearborn, Mich.

Much of the responsibility for taking Ford global in 1995 rests with Bill Powers, who moved into his current position in August.

For years, Ford operated as a confederation of regional car companies sharing little more than the Ford moniker. Then the company decided to build "world cars" that could be sold in any market. But after spending $6 billion to develop the Ford Contour/Mercury Mystique, executives at the Dearborn plant realized they needed to reorganize Ford as a single, truly global company. As a result, on Jan. 1, Ford North America and Ford of Europe begin operating as a single entity.

For the globalization effort to succeed, Powers must ensure that IS develops systems that can share information and integrate business processes on a worldwide basis yet still respond to local conditions.

– Allan E. Alter



Cinda Hallman
Vice president of IS, CIO
Du Pont Co., Wilmington, Del.

Spend a few minutes listening to Cinda Hallman and you begin to believe Du Pont is one giant that just might learn to dance. Dazed by heavy losses in the early 1990s, the megamanufacturer set out to cut annual costs by $1 billion and transform its 600 businesses into a sleek, smartly automated multinational company.

Hallman is a no-nonsense IS careerist who came to Du Pont in 1988 from Conoco, Inc. in Houston. In the past few years she has emerged as an unexpected downsizing hero. By decentralizing 1,200 IS staffers, eliminating 1,000 contractors and shrinking 200 data centers to 40, Hallman slashed Du Pont's IS budget from $1.2 billion to about $700 million. Now, Hallman and the remaining 4,800 IS staffers are focusing on technology that will better link the tens of thousands of Du Pont suppliers and customers. Pilot projects aimed at linking outside production scheduling, order placement, inventory and other systems will rush ahead in 1995.

– Joseph Maglitta



Steve Heckler
CIO
Health Net, Inc., Woodland Hills, Calif.

In Steve Heckler's care is information technology for the nation's fourth-largest health maintenance organization, a $2 billion company with more than 1 million subscribers and a $40 million annual information technology budget. One of Heckler's main challenges in 1995 will be transforming the company into a paperless enterprise by implementing a companywide imaging project.

Also a priority is expanding the California Health Care Information Network to include more than 1,500 physicians and other providers, hospitals and payers. The network, a joint venture of Health Net, Blue Cross of California, Blue Shield of California and Prucare, Inc., is an example of "coopetition," a trend under which competing companies in the same industry share resources to reduce administrative costs and provide customers with a common network interface.

– Julia King

Client/Server's New Order

Status quo no more. Borders once thought untouchable have been breaking down now for several years in the client/server world. And still the landscape changes dramatically from one year to the next. Last year's duds may have finally delivered true client/server solutions — even elegant ones — while those powerhouse tools with all the extras just never really worked like the thing you had before. Keeping track of it all is your job. Making it less painful is ours.

Betting BIG on Johnny-Come-Latelies

Picking tools and technologies from industry veterans used to be safe. Today it's the small newcomers that rule the roost.

By Rosemary Cafasso

When Cummins Engine Co. went shopping for client/server distribution software last year, it selected a package from Avalon Software, Inc., a Tucson, Ariz., company with 215 employees and about as many customers.

John Brown, a director of Cummins' information systems group, says that not so long ago the more obvious choice would have been a much bigger and more well-known software company. But Avalon seemed to offer better technology as well as other benefits — such as a more personal touch he thought was necessary for a client/server implementation.

> Some of the big companies are so impersonal. You get an 800 number, and that's it. What we wanted was to partner with them so that ultimately, we get what we really wanted out of the system.
>
> —Sheila Osler, Sun Life of Canada

Nonetheless, Brown remembers that IS and other Cummins managers went through a rigorous process to show top management that Avalon was a sound choice and a viable company. With those concerns satisfied, the Cummins team believed Avalon provided the best deal they could find.

"Part of the reason was the people running Avalon," Brown says. "They stick to their word a little better than some of the bigger companies.... It seems like the older companies don't get out front there on the technology. Part of the reason was also that they could state a clear direction."

When it comes to client/server decisions these days, Brown's approach is increasingly common.

A noticeable difference

Yesterday's guidelines for selecting a software provider — which typically said big companies were the safe choice — often do not work for client/server. Many IS managers say it isn't that the big companies are doing a bad job of delivering client/server technology — it's just that the little ones often do it better.

"It's the smaller ones that come out of nowhere that will have a new look on things," said Kevin Reilly, vice president of information systems at Richardson Electronics Ltd. in LaFox, Ill.

Reilly, who just began the hunt for client/server financial software, says he is not sure if he will opt for a small software provider, but "there are advantages. You aren't just a number to them."

While dozens of users are still signing up with the so-called safe choices for client/server applications, such as SAP America, Inc., dozens more are selecting tiny companies with handfuls of customers and total revenue that is but a fraction of some IS budgets.

"We're looking for companies that exceed the average in terms of technology," says Connie DeLetis, vice president of IS at National Semiconductor Corp. in Santa Clara, Calif., which is piloting client/server data query software from Business Objects, Inc. in Cupertino, Calif.

"Business Objects is above average," DeLetis adds, for what he says is superior end-user functionality and a highly intuitive environment. He compared its software with end-user query tools from companies such as SAS Institute, Inc. and Information Builders, Inc., which he says target more advanced users and do not have the same level of user-friendliness.

"The risk is that it is a small company, [but] we think the risk may be well worth it," he says.

Interviews with many IS managers who decided on a smaller vendor revealed the following reasons that small is in vogue in the client/server world:

- Small companies are often the only choice on the market for new technology because the bigger companies haven't yet developed products in that area.
- In the long term, smaller companies can more quickly keep up with technology changes than some of the large ones.
- Smaller companies are more likely to establish close, first-name relationships with customers and provide a higher level of service. As a result, customers get the feeling they can more directly impact the technical direction of a product.

Times have changed

In addition, IS executives say one needs to only look at powerhouses such as IBM or Digital Equipment Corp. to realize that large companies are no longer the safest bets.

"There are risks in dealing with big companies as well," adds John Mann, a senior analyst at The Yankee Group in Boston. "They have the vagaries of politics. It's not that the company will fail, but you could end up with a product that became a bum solution."

Some IS executives remember well the old

LESSER-KNOWN SOFTWARE STARS

By Kim S. Nash

Helping to fuel the industry's charge into client/server territory is a group of small aggressive software providers that are not household names. Here's a sampling of who they are and what keys they are using to open the doors to corporate America.

adage that no one ever got fired for ehoosing IBM. "But the guy who said that got fired," says Robert Chin, chief information officer at HealthSource, Inc. in Hookset, N.H.

Chin, who selected Red Brick Systems, Ine. as his provider of a client/server data warehousing platform, says he believes there was more of a "fright mentality" years ago that helped promote the idea that the biggest companies were the best ehoices. Now the trick is to rely on oneself to make the right ehoices.

"The eustomer has to make sure they can touch the product, measure it, verify it to their own satisfaction. That's the only security blanket," Chin says.

But Chin and other IS managers are also quick to acknowledge that the risk factors ean certainly be higher with tiny software providers. Not all start-ups survive, and the really hot ones are often acquired. Users say the trick is to work as many protective measures into the contract as possible.

YESTERDAY'S GUIDELINES FOR SELECTING A SOFTWARE PROVIDER OFTEN DO NOT WORK IN CLIENT/SERVER. MANY IS MANAGERS SAY IT'S NOT THAT THE BIG COMPANIES ARE DOING A BAD JOB OF DELIVERING CLIENT/SERVER TECHNOLOGY, IT'S JUST THAT THE LITTLE FIRMS OFTEN DO IT BETTER.

Mission-critical safety

Some users say they are willing to select small companies for important applications but not the most essential, bet-the-business type of applications.

DeLetis, for example, is working with Business Objects for a elient/server end-user data query application but says National Semiconductor is going with SAP for its core client/server applieations, including manufacturing, financials and human resourees.

And most users insist that source code be placed in an escrow aceount as part of their eontraet so they can get to it if the software provider goes out of business.

But users also say the rewards from working with smaller companies can help offset any risks.

Kevin MeCarthy, a systems eonsultant at the investment management division of Cigna Corp. in Philadelphia, recently selected a client/server multidimensional database system from Dimensional Insight, Inc. in Burlington, Mass. The vendor is projecting 1994 revenue of between $2 million and $2.5 million. McCarthy cited the technology and a good working relationship as key reasons for Cigna's selection.

"The overriding reason is they had the tool we needed," MeCarthy says. "We didn't go out and look for a small company."

In addition, McCarthy says his staff works well with the Dimensional Insight staff. "At the user group last year, they took a vote from the audience about what to put in the next release," he adds. "We found we do have influence on where they are going."

Sheila Osler, direetor of information technology at Sun Life of Canada's U.S. headquarters in Wellesley, Mass., is overseeing installation of a general ledger module from The Dodge Group in Waltham, Mass. The Dodge Group has about a half-dozen customer companies worldwide.

Johnny-come-latelies, *page 52*

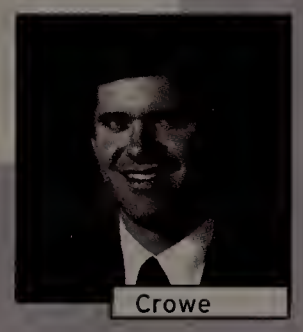

Haas


Liataud

Business Objects, Inc.
Menlo Park, Calif.
Founded: 1990
CEO: Bernard Liataud
Fiscal 1994 sales: $27.8 million, estimated
Key product: BusinessObjects
Comments: BusinessObjects is a combination graphical/English-language end-user query tool that can aceess relational databases such as those from **Oracle Corp.**, **Informix Software, Inc.** and **IBM**. New features include the ability to generate more sophisticated reports and graphs using information the product has pulled off databases. Support for Oracle's Rdb, IBM's DB2 and **Computer Associates International, Inc.**'s Ingres databases is expeeted in 1995.

BusinessObjects' primary competitor is **Cognos Corp.**, with its Impromptu query utility. Yet until Cognos moves Impromptu to platforms other than Windows, BusinessObjects — with its Macintosh and Unix Motif versions — is likely to win more users' hearts.

AT&T Corp. resells BusinessObjeets, and **Prism Solutions, Inc.**, **Red Brick Systems, Inc.** and others jointly market the product.


Crowe

Edify Corp.
Santa Clara, Calif.
Founded: 1992
President: Jeff Crowe
Fiscal 1994 sales: $12.5 million, estimated
Key product: Electronic Workforce
Comments: Electronic Workforce has been called a real-life example of the information superhighway at work. The product is a software-agent-based technology designed to let users automate voice response, fax, phone or workflow tasks in routine administrative departments such as order processing, human resources or aecount inquiries.

For example, **Signet Bank**, a 250-branch bank serving Washington, Maryland and Virginia, recently automated a hot line for employees' charity donations to the **United Way**. Workers can punch in eontribution amounts over the phone and that amount is automatically dedueted from payroll. The updated pledge statistics are then automatically faxed to United Way offices.

Nike Corp. uses Edify produets to automate network backup and for pager notification. Other eustomers include **Apple Computer, Inc.**, **Chevron USA**, **Ford Motor Co.** and **BayBank Systems, Inc.** Electronic Workforce has won the Best of Show award at the annual GroupWare conference for two years running.

IntelliCorp, Inc.
Mountain View, Calif.
Founded: 1980
President: Ken Haas
Fiscal 1994 sales: $12 million
Key products: Objeet Management Workbench, Kappa
Comments: IntelliCorp's Object Management Workbench (OMW), unveiled in March, is what many observers term a complete client/server development environment with object-oriented products from design to generation to maintenance. OMW uses a full life eyele approach to visual development and runs on Unix workstations from **Sun Microsystems, Inc.** and **Hewlett-Packard Co.** as well as Windows PCs.

Informix owns 15% of the company, which it bought for approximately $1.4 million. IntelliCorp, in turn, bought $482,000 worth of products from Informix in fiscal 1994. Further, the window painter piece of Informix's new graphical development tool, New Era, was cobuilt by IntelliCorp, using Kappa. **SAP of Germany** has worked with IntelliCorp to integrate OMW and Kappa with SAP's R/3 line of client/server financial applications. IntelliCorp's board of directors ineludes bigwigs from **Apple** and **Lotus Development Corp.**

Challenging IntelliCorp, however, is the fact that object programming is far from mainstream. Early adopters such as **GTE Corp.** and **US West Communications, Inc.** account for the bulk of IntelliCorp's still-fledgling business.

Legato Systems, Inc.
Palo Alto, Calif.
Founded: 1988
CEO: Louis C. Cole
Fiscal 1994 sales: $16 million, estimated
Key products: NetWorker SingleServer, Staccato
Comments: Client/server systems management can stymie even the most sophisticated IS shops, which in turn leaves a large and growing market hole for companies such as Legato and OpenVision Technologies (see next page).


Cole

Legato started out making management aids for mainframes but quickly teamed up with key OEMs and Unix players, such as IBM, **Sun**, **Storage Technology Corp.** and **Oracle**, to address the pains of coordinating information storage across networks.

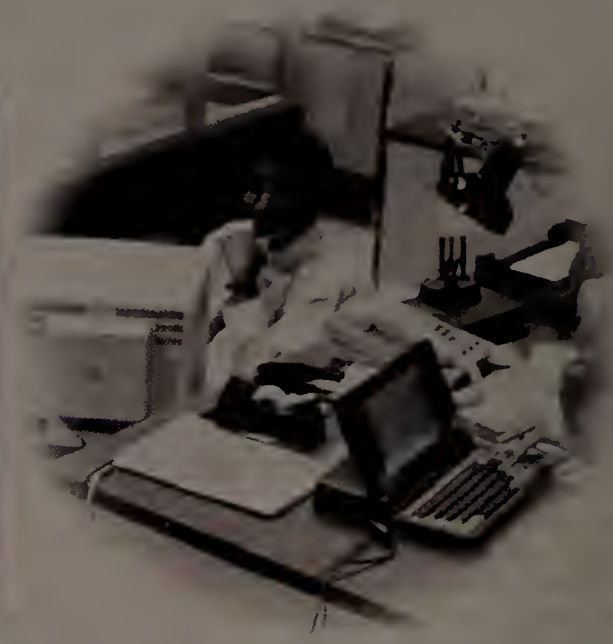
NetWorker SingleServer was designed to provide backup and recovery for Unix and **Novell, Inc.** NetWare servers. Staceato does the same but offers greater automation of the process. The company plans to get into data archiving and database protection starting in 1995.

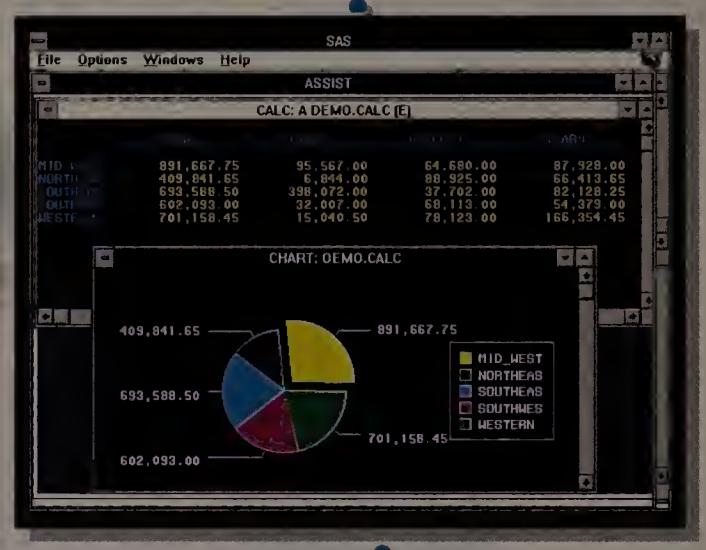
Neuron Data, Inc.
Palo Alto, Calif.
Founded: 1985
CEO: Patrick F. Perez
Fiscal 1994 sales: $27 million, estimated

The Client/Server Solut

The SAS System for Information Delivery is a new concept in client/server software. It provides workable strategies for overcoming the barriers that stand between people and the information they need. For instance, the SAS System strategy for **universal data access** makes it easy to reach all your diverse "islands of information"— including host system files, flat files, and corporate DBMS's such as DB2®, ORACLE®, and dBASE®.

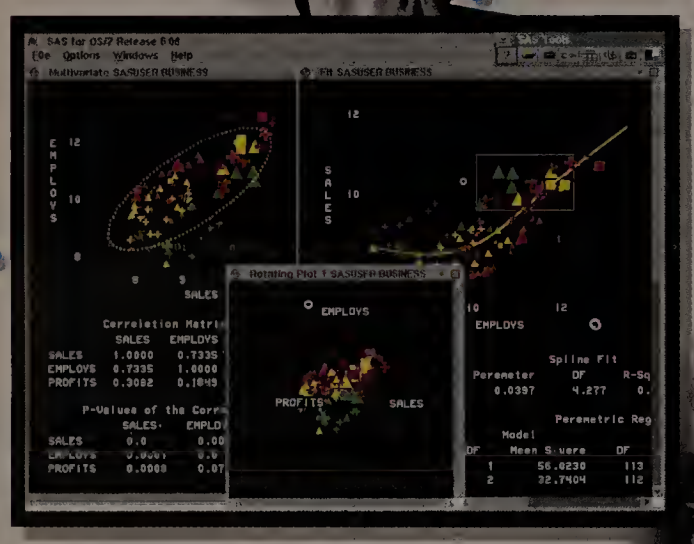


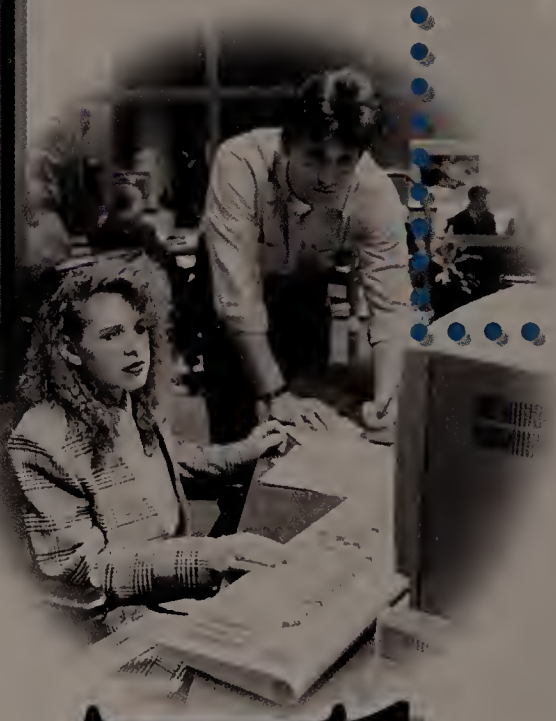




An exclusive MultiVendor Architecture™ is behind the SAS System's strategy for **hardware independence**. Applications run the same way across PCs, workstations, and host systems—making true client/server computing a reality while exploiting the particular strengths of each platform.

Address the needs of users at every level with the SAS System's strategy for **interface versatility**. An EIS interface puts decision makers in command of the facts—when they need them. There's also a task-oriented menu-driven interface for business







The SAS

Enterprise Wide In

ion for EIS and Beyond

analysts... plus object-oriented and full-function programming environments for applications developers.

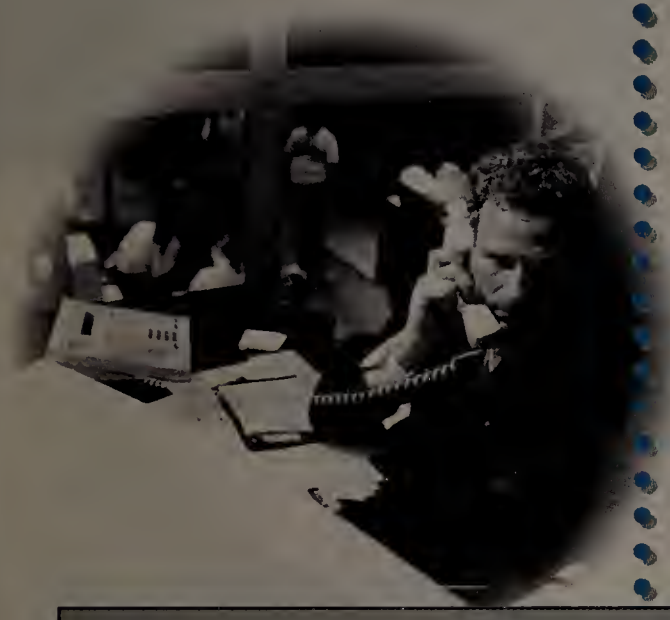
The SAS System's **applications integration** strategy provides one seamless solution for virtually any application that involves accessing, managing, analyzing, or presenting data. Choose integrated tools for decision support, reporting, financial analysis, market research, project management, quality improvement, and more. All backed by SAS Institute Inc., a vital force in the information industry with a strong commitment to helping you succeed—and an unrivaled dedication to training, documentation, technical support, and consulting services.

See for yourself how the SAS System of software brings out the best in your hardware and the people who use it. Just give us a call at **919-677-8200** for a free video, plus details about a free software evaluation.

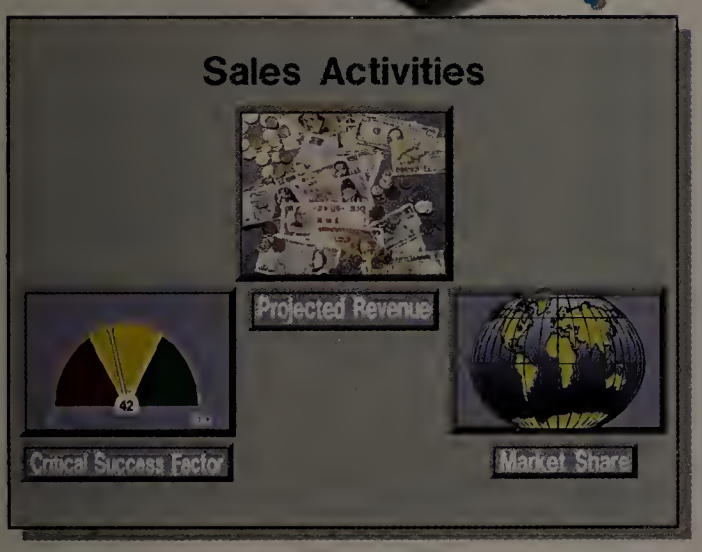














SAS Institute Inc.
Phone 919-677-8200
Fax 919-677-8123

SAS is a registered trademark of SAS Institute Inc.
Copyright ©1993 by SAS Institute Inc.

System

formation Delivery

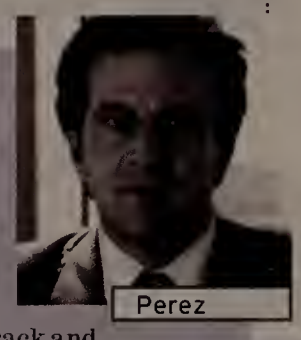
Johnny-come-latelies

CONTINUED FROM PAGE 49

"This is more like a partnership," Osler said of the company's relationship with The Dodge Group. "You get the treatment you expect. Some of the big companies are so impersonal. You get an 800 number, and that's it. What we wanted was to partner with them so that ultimately we get what we really wanted out of the system."

Mike O'Dea, supervisor of financial systems and Unix administration in the corporate division of Ameritech, Inc. in Chicago, recently picked client/server financial software from Atlanta-based SQL Financials, Inc., a 3-year-old company whose customer base grew from 20 to 50 in 1994. He says when he needed to buy a client/server application, "no other companies were really doing it."

He has found that SQL Financials is more focused on keeping customers happy. "You become a partner, and they are more focused on trying to keep you happy," O'Dea adds. "They seem to be more flexible [than larger vendors]. They are fairly responsive and keep in step."✦


Perez

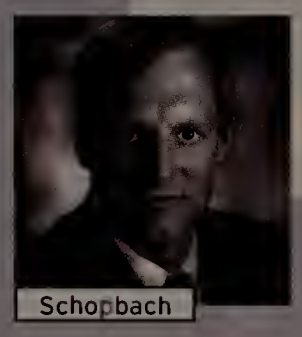
Key products: Nexpert Objects,C/S Elements
Comments: Neuron Data's Nexpert Object is an object-oriented development tool that lets users track and reuse business rules as they build applications. C/S Elements is a graphical scripting language for accessing various data storage devices. In fact, critical to the company's success so far has been its support for both object and relational databases. Large customers include **Chevron Canada Resources,** which bought Neuron products to help move applications off an IBM mainframe to Sun's Unix servers and workstations running Oracle.

OpenVision Technologies, Inc.
Pleasanton, Calif.
Founded: 1992
CEO: Michael S. Fields
Fiscal 1994 sales: $20 million
Key product: OpenVision Object Environment
Comments: In the 2½ years since its founding, OpenVision has acquired 14 companies, divisions, products and product licensing rights in the client/server systems management arena. Put simply, OpenVision is aggressive.

The company was founded and is managed by several former executives from **Oracle, CA, Silicon Graphics, Inc.** and other heavy hitters. Unlike Legato, which addresses many of the same client/server problems, OpenVision sells directly to end-user companies. Major customers include **American Airlines, Wells Fargo Bank** and **NASA.**


Fields

OpenVision's products can be mixed and matched as needed, so users are not boxed into buying more management utilities than they need. A key challenge for the firm, however, will be to enhance the communication methods it uses between its client and server components. Moreover, the products currently talk to one another via remote procedure calls, but some observers note that techniques such as replication or message-based communication are more efficient and less complex.

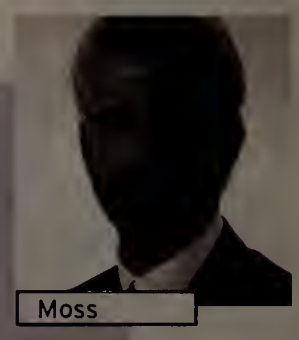

Schopbach

Sherpa Corp.
San Jose, Calif.
Founded: 1984
CEO: Steve Schopbach
Fiscal 1994 sales: $30 million, estimated
Key product: Sherpa
Comments: Sherpa's product data management software was designed to help companies integrate their design, engineering and manufacturing departments. Industrial manufacturers are the company's target users. For example, **Hughes Aircraft Co.** bought $15 million worth of Sherpa products in early 1994 as part of a global re-engineering project aimed at streamlining airplane-making operations. Hughes plans to replace the bulk of its manual and paper processes for both engineers and managers by 1997.

Overall, client/server manufacturing software is a hotter-than-hot market, and Sherpa is not alone in reaping rewards. **Avalon Software, Inc.** in Tucson, Ariz., and **Datalogix International, Inc.** in Valhalla, N.Y., are also burning up the charts with their discrete and/or process manufacturing modules. Datalogix's GEMMS package, aimed at process manufacturers such as chemieal or food makers, was licensed by Oracle in September to be integrated with Oracle's own discrete manufacturing applications. Oracle also bought a 15% equity stake in $25 million Datalogix.

Tivoli Systems, Inc.
Austin, Texas
Founded: 1989
CEO: Frank Moss
Fiscal 1994 sales: $26 million, estimated
Key product: Tivoli Management Environment
Comments: Tivoli Management Environment (TME) is a set of tools that aims to track and troubleshoot network activity in large client/server systems. TME competes with CA's CA-Unicenter framework but is said to hold a key advantage over that product: TME was designed to link to other popular network and systems management products, specifically HP's OpenView and IBM's NetView.

Furthermore, large relational database makers have signed pacts with Tivoli to integrate or otherwise link their products to TME, including **Sybase, Inc., Informix** and **Oracle.**


Moss


Stella Johnson

Robert Chin, CIO at HealthSource in Hookset, N.H., says that in today's world the customer must verify the product to his own satisfaction. 'That's the only security blanket,' he says.

Radical CHANGE Afoot

Under desktop's expanding role, systems management may never be the same

By Steve Moore

When systems management and network management meet head-on in 1995, the shape of the computer industry may well change.

"As enterprise network management consoles [systems] try to work in new PC LAN environments, they are going to have to adapt as a consolidation point for systems management" or risk being limited to Simple Network Management Protocol network functions, while other products handle every aspect of systems management, according to Chris Thomas, enterprise technology manager at Intel Corp.

"From the applications integration perspective, in 1995 systems management applications will still run pretty much stand-alone relative to network management applications," says Dave Passmore, principal consultant at Decisis, Inc. in Herndon, Va. "There will be very little synergy between the two because we're not yet at the point where we will be able to look at both network and systems elements and provide fault isolation or performance information, for example, on an end-to-end basis."

Upping the ante

As systems management and network management vendors work to build synergy among their products, their success will depend heavily on the quality and structure of the databases they use, says Mike Prince, MIS director at Burlington Coat Factory Warehouse Corp. in Lebanon, N.H.

Prince outlined the following database-related developments he says will add significantly next year to the systems management challenge:

- Parallel database queries spread across multiple processors.
- Clustering of multiple systems around the same disk and coordination of access so all systems can update the disk.
- Replication of data across a network so instead of sharing a disk, multiple nodes coordinate updates to multiple instances of the same database.

"Those things all add complexity to the administration of the system," Prince says. "And they make your requirements for really precise systems management become more stringent."

Consortium at the ready

Supporting precise systems management is what the Desktop Management Task Force (DMTF) industry consortium is all about. By late 1995, users will be able to use the DMTF's Desktop Management Interface (DMI) standard to manage LAN servers as well as LAN-attached PCs. DMI prescribes a consistent way for both desktop PCs and servers to provide information about themselves to systems management and network management applications.

IBM and SunSoft, Inc. have already said they will support DMI in their Unix operating systems by 1995.

"Look to the end of 1995 for the advent of DMI in other server operating systems, including NetWare and [Windows] NT," says Shannon Gray-Voigt, DMTF chairman and industry standards marketing manager at Intel.

Gray-Voigt highlighted the following additional DMI-related trends that will emerge in 1995:

- PC software application vendors will begin implementing DMI. They will initially focus on asset management, auditing and metering functions.
- Computer vendors will begin giving users the ability to retrofit legacy PCs and servers with DMI capabilities so that they, too, can be an integral part of users' systems management domains.

DMI currently specifies management information files (MIF) for hardware (PCs, modems, network interface cards and so on), while MIFs for software packages are slated to be be completed in 1995.

Together, these MIFs will provide detailed information about the hardware and software in each managed device in a client/server network. And systems management applications can use the DMI data to support various systems management functions, such as software distribution, metering and performance management.

- Computer vendors will also begin to use DMI as a basis for remote systems management. Beyond the business office, "we'll see a push toward remote service and support capabilities for PCs in the home," Gray-Voigt says. In 1995, the DMTF will begin working with vendors to extend DMI to support remote desktop systems management, she says, noting that DMTF participants recognize the complexity but intend to deal with it.

As systems management products gain broader functionality in 1995, "we'll see more highly integrated suites of systems management applications that will be managed from a common console with a common database," says Nev Grove, director of product management at Symantec Corp. in Los Angeles.

Grove notes that desktop-oriented management applications such as software distribution packages will also become more tightly integrated with high-end enterprise network management platforms.

> WHILE 1995 WILL BE A YEAR OF IMPROVEMENTS IN SYSTEMS MANAGEMENT, 1996 WILL SEE THE FLOWERING OF APPLICATIONS MANAGEMENT AS A SEPARATE, SOFTWARE-ORIENTED SCHOOL OF THOUGHT DISTINCT FROM SYSTEMS MANAGEMENT, WHICH WILL BECOME MORE HARDWARE-ORIENTED.

Parting of the ways

While 1995 will be a year of improvements in systems management, 1996 will see the flowering of applications management as a separate, software-oriented school of thought distinct from systems management, which will become more hardware-oriented, Thomas says.

"We're not yet hearing from many vendors that are managing the performance and output of specific applications that are running your business," he says.

In the future, "the application itself could figure out how to get the most out of the machine it's installed on by looking at the hardware and at other software on the same machine," Grove says.

He adds that DMI will support dynamic, real-time systems management functions as well as more static, archival functions.

Ultimately, as users' systems management capabilities become more sophisticated, they will be able to directly measure and monitor the computer resource use of competing business applications, such as word processors or spreadsheets.

That may not please application vendors whose software turns out to be less efficient than competing software, but it certainly will please users as they move beyond systems management to full-fledged applications management.✦

DMI FORECAST

Early 1995
- Significant number of hardware implementations of DMI.
- Pioneering applications vendors begin adding DMI support to PC software.

Mid-1995
- Still minimal synergy between network management and systems management applications.
- Applications management emerges as a third challenge distinct from network management and systems management.

Late 1995
- DMI implementations in all major server operating systems.
- DMI support incorporated into most new PCs and legacy PCs.

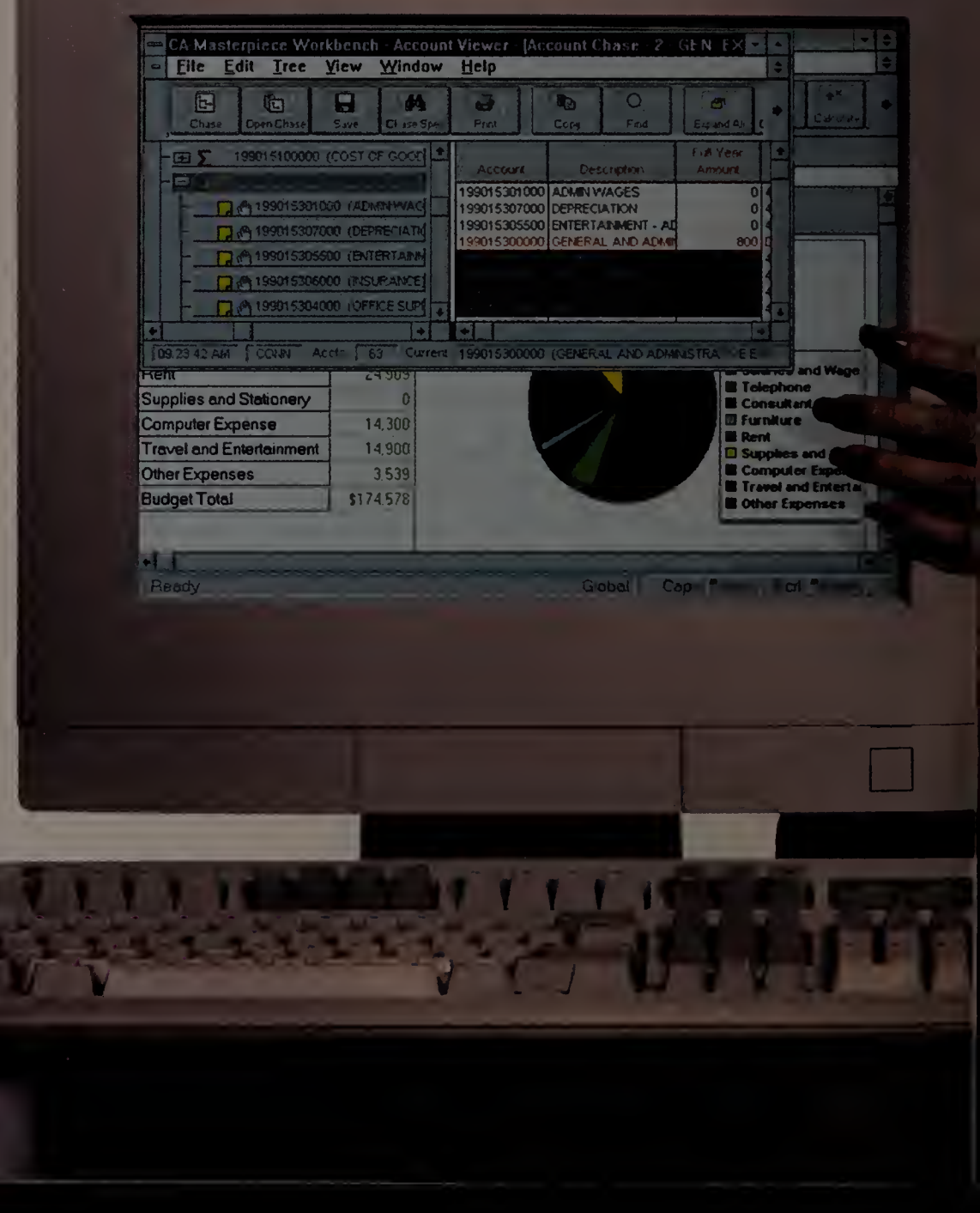
Introducing The Only
That Can Produce T



98% of the Fortune 500 companies have reached the same decision on business software: Computer Associates.

From accounting clerks to your executive work force, Masterpiece makes everyone more productive. With a graphical interface that's simply the easiest thing you've ever seen.



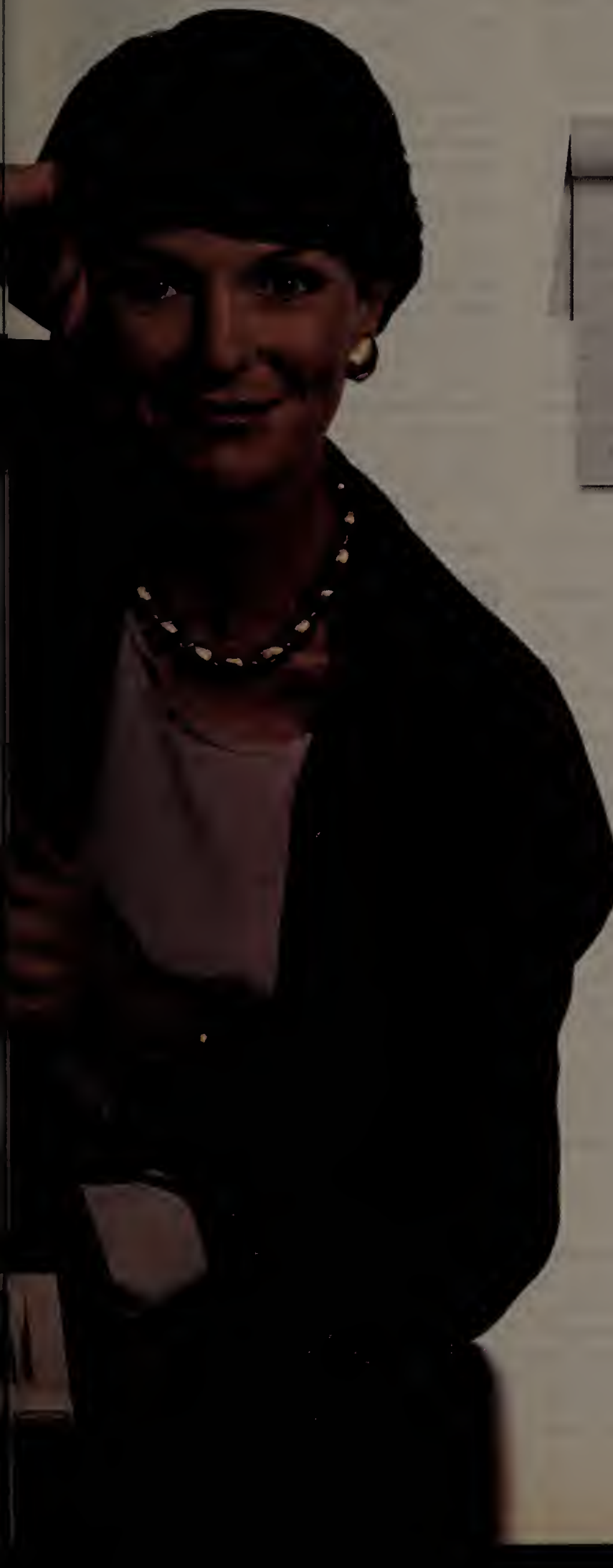




Masterpiece is multi-currency, multi-language and multi-company. So you can consolidate financials from around the world.

COMPUTER ASSOCIATES®
Software superior by design.

Financial Software hese Statements.



CA90s

CA90s is the truly open architecture that lets Masterpiece cross virtually every major platform and operating system.

- **Multi-dimensional modeling**
- **Multi-platform**
- **GUI client/server tool**
- **Query and reporting tools**
- **Mission-critical**
- **Industrial-strength**



One click connects you to the only financial software with proven client/server technology. CA-Masterpiece/2000.

We couldn't make that kind of statement unless CA-Masterpiece®/2000 could back it up. And it can. Thanks to a new breed of client/server financial software that delivers on everything you've been waiting for.

Proven client/server technology. Distributed and cooperative processing. UNIX. Windows. A common user interface. Open architecture. SQL. WYSIWYG. And multi-dimensional modeling.

But Masterpiece is not merely about stunning technology. It's about the benefits that technology provides. Real-time data access. Advanced decision-support tools. Global capabilities. More timely and accurate data. And increased work force productivity. Together, it all adds up to greatly lower costs for your business.



For More Information And A Free Booklet, Call 1-800-225-5224, Dept. 51102.

We'll show you even more reasons why, in financial software, Masterpiece is the best place to put your money.

CA-Masterpiece®/2000

Client/Server Financial Software

© Computer Associates International, Inc., Islandia, NY 11788-7000.
All other product names referenced herein are trademarks of their respective companies.

Sizing up the BIG GUYS

By Mary Brandel and Mark Halper

This was the year that every vendor became a client/server vendor. But their products and prospects are all over the map. **Computerworld** polled industry opinion leaders to find out how the big-name vendors stack up in the client/server biz. We offer pros, cons and a consensus letter grade.



SOFTWARE MAVENS

COMPUTER ASSOCIATES INTERNATIONAL, INC.

PRO: CA has come a long way in client/server during the last year. Unicenter systems management software is finally catching on in the Unix world, and NetWare and NT ports should be coming. CA now offers Unix applications in banking, human resources and manufacturing. Its acquisition of The ASK Group provides an entree into relational databases.

CON: Customer relations have always been rocky, and CA's legacy as an aggressive enforcer of pricing terms could pose difficulties. Its reputation as a systems software provider could work against it in tackling applications and development tools.

GRADE: B

LEGENT CORP.

PRO: Legent is on the right track with its XPE cross-platform systems management tool. XPE's multiple protocols provide a solid middleware foundation. Legent has a strong revenue base from its history of growth by acquisition.

CON: Legent and third-party vendors have been slow to offer applications that leverage XPE. It is fighting its image and legacy as a player in the mainframe arena where it is still very active.

GRADE: B+

POWERSOFT CORP.

PRO: If the computer industry were a popularity contest, PowerBuilder would win. Powersoft will deliver multiplatform support this year for more enterprise-class apps. Plus, PowerBuilder 4.0 includes data replication and support for OLE 2.0 and ODBC 2.0.

CON: Even with Version 4.0, PowerBuilder is too dependent on client-based processing. Still missing: application partitioning, integrated transaction management and the ability to build apps for a three-tier architecture. No one knows what effect being bought by Sybase will have.

GRADE: A+

SAP AMERICA, INC.

PRO: SAP's phenomenal two-year rise to client/server leadership will make it a $1.2 billion to $1.3 billion company this year, with a large portion of that coming from its 1,800 R/3 customers worldwide. It recently unveiled a bundled system for smaller customers and will ship R/3 Lite this year. Its enormous functionality, strong international capability and worldwide presence should keep SAP a leader in 1995.

CON: There is a side effect to SAP's fast rise. Support issues are stretching the company's resources. A major challenge will be to quickly establish frameworks of technical expertise, particularly in the U.S., and make R/3 easier to use and less expensive for smaller companies. Oracle will undoubtedly turn up the competitive flame this year.

GRADE: A+

BORLAND INTERNATIONAL, INC.

PRO: Borland has finally delivered dBase for Windows and the Borland database engine. It is aggressively stepping up its "upsizing" tool offerings, and the new Interbase for NT is ready to ship.

CON: Simply put, sales. It's not clear Borland will derive enough revenue from its tools and applications to drive a client/server strategy. DBase for Windows so far has had little success, and tools are not a mass market item, although the forthcoming Delphi visual developer is turning heads.

GRADE: C

LOTUS DEVELOPMENT CORP.

PRO: Notes 4.0 should be a winner in the groupware category. It should have better database integration and SMP support than earlier versions. Expect more "pay-per-drink" pricing as Lotus and partner AT&T move out of the pilot stage of a trimmed-down network version of Notes.

CON: Lotus' approach to groupware is not as modular as some of the competition's, and there is plenty.

GRADE: B

MICROSOFT CORP.

PRO: Like it or not, Microsoft has it all on the desktop. NT is building steam on the enterprise. If Windows 95 – perhaps the most successful "vaporware" ever – does all it is said to, it could make Mac OS even more of an also-ran. Microsoft's ability to use pricing as a weapon as well as its control of hardware OEMs is awesome.

CON: If Windows 95 becomes Windows 96, users and independent software vendors may finally lose patience and shift some dollars to OS/2. The company's inability to deliver Exchange, its messaging platform, has hurt its position in the groupware market.

GRADE: A+

SYMANTEC CORP.

PRO: Based solely on name recognition and the current fragmented market, Symantec stands a chance as a distributed systems management provider. It also holds 60% of the PC network utilities market since its purchase of Central Point Software. Symantec's Powersoft challenger, Enterprise Developer, has met with positive reviews. Its second version of PCAnywhere for Windows is said to be more robust than the buggy Version 1.0.

CON: Desktop domination does not necessarily translate into enterprise success. Its traditional business is threatened by Microsoft, which continues to put desktop utilities in the operating system, and by remote access suppliers, which are trying to horn in on PCAnywhere.

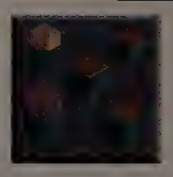
GRADE: B+

WORDPERFECT (Novell Applications Group)

PRO: GroupWise, the new groupware product from WordPerfect, includes broader networking protocol support than has been WordPerfect's norm. Its link to Novell lends ample market clout. SoftSolutions should strengthen GroupWise with rich document management features. GroupWise's inclusion in Novell's Corsair product will be a plus.

CON: Lots of entrenched groupware competition, so this will be a steep uphill road.

GRADE: B



DATABASE EXPERTS

INFORMIX CORP.

PRO: Its strengths in parallel processing are a boon to the back end in the client/server world where Informix mixes well with Unix. It has a strong alliance with Microsoft on the low end and NT commitment.

CON: Informix does not seem to care about full-fledged replication, which some users want when they connect databases distributed across multiple sites. Its commitment to NetWare is questionable.

GRADE: B+

ORACLE CORP.

PRO: Oracle is about as much of a one-stop shopping vendor as there is in the database and application world, and it seems to have shaken its legacy as a vendor of proprietary systems.

CON: Oracle and its database competitors face a serious pricing challenge from Microsoft, which threw down the gauntlet earlier this year with a $20,000 unlimited user license. It has been stingy with pre-release code.

GRADE: B

SYBASE, INC.

PRO: As Sybase will gladly tell you, it has been in the client/server game perhaps longer than any other

Illustrations: Lin Wilson

database vendor. Experience counts, and Sybase has grown up on Unix. It also has ambitious plans to support NT, OS/2 and NetWare.
CON: Its historic weakness in development tools should be addressed by its expensive acquisition of Powersoft, but questions abound about whether it can keep Powersoft's products database-independent and still sell them. Sybase faces the same pricing challenges as Oracle, and the fallout from its SQL Server split with Microsoft could prove harmful.

GRADE: B+



SYSTEMS LEADERS

APPLE COMPUTER, INC.
PRO: Apple is regarded by many as the best system vendor on the client side of the equation. New PowerPC systems are its fastest and least expensive desktops ever. IBM's apparent backing of a common PowerPC system design is a boost.
CON: Windows 95 could practically neutralize Apple's operating system edge. Apple needs NetWare support on its servers. Big questions: Will IBM license Mac OS (IBM says no), and will Apple and IBM actually finalize a common hardware platform?

GRADE: Incomplete until Apple moves on its operating system licensing project.

AT&T GLOBAL INFORMATION SOLUTIONS
PRO: By aligning the company behind "customer-focused solutions," AT&T GIS has hit on something that customers actually need: sales/marketing systems that generate revenue. Plus, it has products to back up its claim. AT&T GIS is also viewed as a strong NT integrator and a market share leader in NT servers.
CON: Few understand AT&T GIS' concept of selling systems that are packaged but that also need to be customized. Like Lotus with Notes, the company has a lot of explaining to do.

GRADE: B

DIGITAL EQUIPMENT CORP.
PRO: Digital finally has a client/server tale to tell. Its Unix is technically strong, and it is bolstering NT with management software and possibly clustering this year. Its new Alpha AXP-based SMP servers – finally the right size for NT – are well regarded. Microsoft, Lotus and Novell chose Digital's services group to provide distributed support, and its network group is a well-kept secret.
CON: Many users cannot fathom Digital's strategy. They question its software direction and support for three operating systems. In Unix, Digital must compete with HP, a formidable competitor. Alpha sales now exceed VAX revenue, but that's mostly in workstations.

GRADE: C

HEWLETT-PACKARD CO.
PRO: HP moved to RISC long before Digital and other rivals and is now collecting the dividends. It is strong across the client/server computing board in PCs, workstations, large systems and servers, networking, object technology and management tools. HP is also doing a fine job of opening up its proprietary HP 3000 system and has become a whirlwind of services.
CON: It's hard to find a pressing flaw, but HP's stated plans to move to a "post-RISC" architecture in two years with Intel could ruffle a user base concerned with backward compatibility. HP also has high-end scalability shortcomings.

GRADE: A

IBM
PRO: Customer loyalty is still pretty strong, and IBM has lots of horses in its stable, including multiple desktop and server offerings, networking tools and the ability to tie in workhorse proprietary architectures. Warp OS is gaining speed.
CON: IBM is still encumbered by a mainframe image it may never completely shake. Still in recovery mode and uncertain about strategic directions, IBM supports more than a half-dozen operating systems as well as dual desktop hardware platforms with PowerPC and X86.

GRADE: B+

SUN MICROSYSTEMS, INC.
PRO: By focusing on servers and networking – not workstations – Sun stands a better chance of gaining corporate mindshare. Its Unix servers are now "PC LAN administrators," and it released a faster Solaris that runs on both SPARC and Intel chips and supports NetWare boxes. Solaris will become object-oriented in '95 through the NextStep operating system. Sun reorganized SunSoft into a unified division. Making nice with Microsoft was a good move.
CON: With profit margins narrowing on workstations, Sun needs to push heavily into servers while remaining vigilant on price. It is limited in that endeavor by its single operating system strategy. Although working on its 64-bit UltraSPARC, Sun is currently behind the power curve with its 32-bit SuperSPARC.

GRADE: B



NETWORKING CONTENDERS

3COM CORP.
PRO: This billion-dollar baby has done an excellent job of buying up and integrating router, switching, hub and WAN connectivity technologies. It is well established in local-area and internetworking and has a realistic position on SNA and routing.
CON: The big challenge is to unify its acquisitions under the Transcend management umbrella. Higher port densities, especially in its high-end routers, are needed.

GRADE: A+

BANYAN SYSTEMS, INC.
PRO: Banyan has a new focus: electronic messaging applications. The Beyond purchase and work with Collabra Software portend solid workflow/groupware offerings. Its network operating system-independent network services are now on major Unix platforms. A corporate reshuffling, revived channel strategy and strengthened international focus may improve marketing, its biggest downfall.
CON: This Rodney Dangerfield of network operating system vendors is virtually ignored by big players despite its presence in large networks.

GRADE: C

BAY NETWORKS, INC.
PRO: It took a while, but when the combined SynOptics and Wellfleet finally voiced its view of integrated hub, switching and routing technology for high-speed networks, it hit all the right market trends. Bay's relatively small installed base will allow the company to stay light on its feet and take necessary risks.
CON: Its vision is wonderful, but the market won't be forgiving if Bay cannot follow through and ship products on time.

GRADE: B+

CABLETRON SYSTEMS, INC.
PRO: A well-known and popular hub vendor, Cabletron has a good handle on the evolution toward switching hubs and ATM to the desktop. It has also begun to lay the groundwork for IBM connectivity.
CON: Like Cisco, Cabletron is locked with Bay in a deadly embrace for leadership. It may be tough to retain lone-wolf status in an increasingly consolidating market.

GRADE: B

CISCO SYSTEMS, INC.
PRO: Cisco is the king of enterprise routers. Its clout alone could propel the company into ATM switches and the virtual networking arena. The Kalpana acquisition will boost Cisco's ability to create a switching hub and LightStream should help with ATM.
CON: With ATM around the corner, it needs to branch out to maintain its aggressive growth plans. It must continue to strengthen and deliver on SNA routing and master ATM while not undermining its strength in routers by spreading itself too thin.

GRADE: A+

NOVELL, INC.
PRO: Novell heads into 1995 weaker but wiser: The business is pared down, and "coopetition" with Microsoft has been forged. If NetWare 4.1's directory-building tools live up to their promise, users may be encouraged to migrate to enterprise levels. Other promising developments: NetWare database servers and telecom services.
CON: All of its major products were delayed last year. And as NT threatens to encroach further on would-be low-end Unix environments, Novell's offerings aimed at that sweet spot – wide-area directory services, NetWare 4.1 and UnixWare – have garnered only lukewarm support.

GRADE: B+

NOTE: Analysis and assistance provided by Barry Wilderman, Meta Group, Inc.; Donald DePalma, Forrester Research, Inc.; Tom Nolle, CIMI Corp.; Bob Sakakeeny, Wayne Kernochan and Charlie Robbins, Aberdeen Group; Nina Lytton, *Open Systems Advisor*; Curt Monash, Monash Information Services; Nancy Stewart and Kimball Brown, Dataquest, Inc.; Mary McCaffrey, Alex. Brown & Sons, Inc.; and Chet Geschickter, Hurwitz Consulting Group, Inc.

STAY SEATED- More Turbulence Ahead

Short-term chaos in the network industry should pay off for users — eventually

By Stephen P. Klett Jr.

There is no respite in sight for users feeling pummeled by the consolidation craze in the networking arena. Next year promises to bring more of the same as vendors race to bring users the high-speed networks needed to run client/server applications.

The merger of Wellfleet Communications, Inc. and SynOptics Communications, Inc. into Bay Networks, Inc.; 3Com Corp.'s acquisition of NiceCom, Inc.; and Cisco Systems, Inc.'s purchase of LightStream Corp. and Kalpana, Inc. are examples of consolidations that have occurred during the past six months (see chart).

Analysts and users say continued consolidation will deliver the long-term benefit of higher network performance and simplicity via integration of routing and switching technologies. However, for the short term, consolidation is creating a major headache, they say.

"You get two different stories when you ask two vendors what their relationship to each other is," says Farrokh Billimoria, vice president of network engineering at Bankers Trust Co. in New York. "It's somewhat amusing, but it's also very confusing. Just when you think you understand what two vendors see in each other, they go after someone else."

Switching boom

The bulk of the integration activity is centered around the need to acquire LAN and Asynchronous Transfer Mode switching. Devices such as switching hubs promise to boost the bandwidth of users' LANs by either breaking them down into smaller LAN segments or delivering dedicated bandwidth to individual user desktops on a port-by-port basis. Down the road lies the promise of virtual networking.

This bandwidth boost is an immediate concern to users as they implement popular client/server applications, which are pushing network pipes to their limits. For example, documents created using Lotus Development Corp.'s Notes application can contain voice and video clips, making them veritable bandwidth hogs.

Most industry analysts say they expect switching to be the highest area of growth in the networking market for the next several years. The current $200 million switched Ethernet market alone is expected to hit as much as $5 billion in the next three to five years, according to some estimates.

The high-growth appeal of this market spawned a slew of start-up companies in 1994, including Centillion Networks, Inc., Agile Networks, Inc., NiceCom, Xylan Corp. and Amber Wave Systems, Inc. Many of these companies are prime takeover candidates for more established companies with pocketfuls of change, according to analysts (see chart).

Some start-ups believe this puts them in the catbird's seat when dealing with established vendors that are on the acquisition prowl.

"The market is extremely vibrant and large, and there are plenty of opportunities for start-ups," says Bobby Johnson, president of Centillion Networks. Johnson says some companies have already approached him about a possible acquisition, but there are no plans to sell — at the moment. "Our corporate goals are to grow a very vibrant and sustainable business," he says. "You don't have to sell . . . but sometimes someone offers you enough money to make up your mind for you."

Taking a shortcut

The quickest way for established vendors such as 3Com and Cisco to get in on the action is to buy switching technology rather than develop it on their own. This is a driving force behind the consolidations.

In addition, switching hubs perform many of the same functions as routers, and users want to see these platforms integrated. This is the main reason Wellfleet and SynOptics decided to merge.

"There is definitely a lot of pressure to bring these technologies together," says Andy Ludwick, president and chief executive officer at Bay Networks in Santa Clara, Calif.

Users, meanwhile, remain optimistic.

Performance issues aside, "I like the idea of having everything integrated into one box for management and floor space conservation purposes," says Bill Blackmer, senior information support analyst at the County Marin Data Processing Department in Novato, Calif., which uses SynOptics hubs. Blackmer says he is bullish on Bay Networks because "SynOptics did not have any routing built into its hub. This was killing them and was the main reason we almost dropped them."

"It's clear that users want and need a box that combines routing and switching," says Robert Finocchio, executive vice president of network systems operations at 3Com in Santa Clara, Calif. "We all have to have these technologies in various combinations. We can't afford to take a religious stance."

> "IT'S CLEAR THAT USERS WANT AND NEED A BOX THAT COMBINES ROUTING AND SWITCHING. WE ALL HAVE TO HAVE THESE TECHNOLOGIES IN VARIOUS COMBINATIONS. WE CAN'T AFFORD TO TAKE A RELIGIOUS STANCE."
> — Robert Finocchio, 3Com

3Com, which makes its own hubs and routers, purchased NiceCom in October to acquire ATM switching. In 1993, it purchased Synernetics, Ine. for Ethernet switching technology.

On the way

So far, however, the shakeout many observers expected would accompany the consolidation has yet to occur, but some think it is looming just over the horizon.

"Once the acquirer's appetite gets full then there won't be any room left on the vine for any of the other fruit," says Craig Benson, chairman and chief operating officer at Cabletron Systems, Inc. in Rochester, N.H. Benson expects consolidation to continue for the near term, followed by some shakeout in the latter half of 1995 and early 1996.

Financial analysts agree.

"We expect to see some shakeout [in 1995]. There are far too many companies at the workgroup level, and natural selection will determine who succeeds or fails," says Kevin Fong, general manager at Mayfield Fund, a venture capital firm in Menlo Park, Calif.

There are literally hundreds of companies focused on building hubs and switches for workgroup applications. The general consensus is these will boil down to three or four multi-billion-dollar companies — read Bay Networks, Cisco, 3Com and Cabletron — and a few dozen $100 million firms focused on specific niche markets.

The ATM market is also setting itself up for a shakeout, observers say. "We're going to see a lot of panic surface in the ATM market," says Lawrence Lang, senior product line manager at Cisco. "There are 500-plus vendors right now positioning for ATM, all figuring they can make $100 million. I think I can guarantee ATM's not going to be a $50 billion market." ✦

Return of the CONSOLIDATOR

ACQUISITION HITS IN 1994	POTENTIAL TARGETS IN 1995
Artel Communications Corp. David Systems, Inc. **(both by Chipcom Corp.)**	Agile Networks, Inc.
LightStream Corp., Newport System Solutions, Inc. Kalpana, Inc. **(all by Cisco Systems, Inc.)**	Alantec Corp.
NiceCom, Inc. **(by 3Com Corp.)**	Centillion Networks, Inc.
Network Systems Corp. **(by Storage Technology Corp.)**	Fore Systems, Inc.
SynOptics Communications, Inc. Wellfleet Communications, Inc. **(merged into Bay Networks, Inc.)**	Grand Junction Networks, Inc.
Xyplex, Inc. **(by Raytheon Co., pending)**	NetEdge Systems, Inc.
	Xylan Corp.

Software Tsunami Headed This Way

By Stephen T. McClellan and Christopher C. Shilakes

Stand back — the turbulent client/server market is surging. Leading player Oracle Corp., with an estimated $2.5 billion in revenue for 1994, is showing revenue for the most recent quarter that is 40% greater than revenue for the same quarter last year. Other major players such as Sybase, Inc. — which is one-third the size of Oracle — are hanging on, trying to control breakneck growth of more than 60% while scrambling to broaden through acquisition.

Databases and accompanying products have taken the lead as the fastest growing client/server market segment, but development tools such as Powersoft Corp.'s PowerBuilder and packaged applications such as those from SAP America, Inc. and PeopleSoft, Inc. are on its heels.



Bill Russell

McClellan (left), and Shilakes

As many more companies this year move from pilot client/server applications to enterprisewide implementations, they are choosing not to wade through this spongy ground alone. They're getting help from new-wave systems integrators and application development firms such as BSG, Inc. in Houston and Cambridge Technology Partners, Inc. in Cambridge, Mass. Or they're getting help from their client/server providers.

Oracle's service, consulting and support business, for instance, has ballooned almost 40% over last year's figures and accounts for nearly half of its total revenue. Other vendors such as Sybase and Informix Corp. are also making major investments in this arena. While vendors scramble to fill the demand for services, their service profit margins remain low. But look for these margins to improve over the next several years as vendors learn to run these operations more efficiently.

More widespread corporate adoption of client/server applications is also prompting cries from systems administrators for improved administration and security tools to manage these widely distributed client/server resources. Their pleas have so far gone unheard. But some vendors are moving to fill the gap.

With client/server revenue at just 10% to 15% of its total, Computer Associates International, Inc. is growing in this area at a rate of almost 100%.

Other mainframe-based providers have chosen to enter the game by acquisition. CompuWare Corp. purchased Uniface Corp. to acquire a framework and tools for entering the client/server systems management market. BMC Software, Inc.'s purchase of development company Patrol early in 1994 represented a similar move.

And look for newcomers such as OpenVision Technologies, Inc. and Tivoli Systems, Inc. to gain speed in 1995.

Recent acquisition targets have been small to midsize, narrowly focused companies such as Intuit, Inc. or narrow market sector orientations such as Powersoft. Vendors of application development tools and systems management utilities look like attractive acquisitions for 1995.

Acquisitors will remain primarily midsize vendors seeking broader product lines, distribution channels and the scale to compete against industry juggernauts. Witness Sybase paying some $904 million for Powersoft.

Don't expect industry leaders Microsoft Corp. and Oracle to stand still, though. Oracle's purchase of Digital Equipment Corp.'s Rdb and a midyear opportunistic run at Gupta Corp. to obtain low-end development tools as well as Microsoft's merger with Intuit are just a prelude to 1995 activity.

Continued industry consolidation means added challenge for users. While it may translate into improved financial viability, such upheaval often defocuses company management and disrupts development efforts. So be prepared for the tsunamis of 1995.✦

McClellan is a first vice president and Shilakes is an industry analyst at Merrill Lynch & Co. in San Francisco.

What's HOT and What's NOT

Industry analysts give their 1995 stock market preview

Compiled by Tim Ouellette

Michael Murphy
California Technology "Stock Letter," Half Moon Bay, Calif.

PICKS FOR 1995

Seagate Technology, Inc.: Demand for storage is accelerating, and it makes the most money and has the best margins at the high end. [It's] a great way to play to the continued strength in the PC market, and the stock is dirt cheap.

Adobe Systems, Inc.: After the merger with Aldus, it is now a $500 million software company with little overlap from Microsoft Corp. Its niches look to be the fastest growing areas, including multimedia and desktop publishing.

Auspex, Inc.: The demand for Unix servers is growing with client/server's popularity. It has the best reputation based on customer satisfaction surveys, and being in a different category, it is not subject to brutal price competition from Sun Microsystems, Inc. and Hewlett-Packard Co.

PANS FOR 1995

Storage Technology Corp.: Its iceberg product is so late it missed the window and now has brutal competition from EMC Corp. and IBM. The stock is way overpriced, and it is only getting half the price it targeted to have on the Iceberg product.

Micron Corp.: The falling prices of [dynamic RAM] due to the increase in foreign production leaves Micron totally exposed, so price reductions go right to the bottom line.

Qualcomm, Inc.: It is pumping [Code Division Multiple Access] as the replacement to the current [Time Division Multiple Access] system, but it has never worked. It is just too late.

BEST PICK OF 1994

Alantec Corp.: I recommended the stock at 10, and it is sitting today at 20 due to the move away from routers to intelligent switching hubs.

WORST PICK OF 1994

Weitek Corp.: We bought it at 3. It went up to 14 then back down to 3.

Thomas Carley
Jensen Securities Co., Portland, Ore.

PICKS FOR 1995

Planar Systems, Inc.: It just came in with a blowout fiscal quarter and is well-positioned for fiscal 1995. The flat-panel market is also growing.

Tektronix, Inc.: The stock has done well. It is starting to show top-line growth, especially with the pickup in Europe and high growth in the color printer group. New management has done well to reduce overhead.

Egghead, Inc.: New management has revitalized the retail operation. A larger retail format is expected in first-quarter 1995, and the company will benefit from the release of Windows 95.

BEST PICK OF 1994

Planar Systems: Rated a Buy when the stock was at 11, and it went to 19.

WORST PICK OF 1994

None in the technology field.

Jeffry Canin
Salomon Brothers, Inc., San Francisco

PICKS FOR 1995

Parametric Technology Corp.: It had a stunningly good year, with 26 quarters in a row of sequential upticks in earnings. It expects to expand market opportunities with a low-cost version of its software coming out next year.

Autodesk, Inc.: About to release another product in its AutoCAD line.

Silicon Graphics, Inc.: Fundamentals favored.

BEST PICK OF 1994

Autodesk

WORST PICK OF 1994

Cray Research, Inc.

Charles Finnie
Volpe, Welty & Co., San Francisco

PICKS FOR 1995

Avid Technology, Inc.: The leading provider of digital nonlinear video editing systems.

Macromedia, Inc.: The leading provider of multimedia authoring systems.

Edmark Corp.: The leading provider of children's early learning software.

BEST PICK OF 1994

Avid Technology, Inc.: It went from 20 to 42.

WORST PICK OF 1994

Broderbund Software, Inc.: I put a hold rating on the stock when it went from 50 to 70.

David Benhaim
First Albany Corp., Boston

PICKS FOR 1995

Oracle Corp.: It owns a platform and can set standards. The company is learning to work as a superpower in the industry.

BMC Software, Inc.: The stock is cheap, and it is concentrated on the database – the only area in mainframes that is growing. Databases are also the center of client/server.

MapInfo Corp.: Its product helps people visualize information to make decisions effectively.

BEST PICK OF 1994

Project Software & Development, Inc.: People had trouble understanding the technology, but when it became public, it came on strong.

WORST PICK OF 1994

Legent Corp.: The most frustrating stock of my life – tremendous potential, yet it hasn't delivered in financial performance.

Bruce Hadburg
Raymond James & Associates St. Petersburg, Fla.

PICKS FOR 1995

Sequent Computer Systems, Inc.: Strong focus on services and enterprise solutions.

Stratus Computer, Inc.: Its penetration with new accounts continues.

Silicon Graphics, Inc.: Strong industry focus; not trying to do everything.

BEST PICK OF 1994

Sequent: Done well since we picked it up.

WORST PICK OF 1994

Unisys Corp.: It is just taking longer than expected for the story to play out.

The Disconnected Worker

Changes in the workforce and in technology are creating the need to support increasing numbers of telecommuters and traveling workers. With 30% of the American workforce self-employed or partially self-employed (and the number rising), supporting a constantly shifting workforce is one of the biggest challenges IS will face during the next several years. Here are some tips on how to accommodate disconnected workers without leaving corporate systems vulnerable.

Out of Sight NOT Out of Mind

Providing round-the-clock support for a remote workforce presents new challenges

By Jean S. Bozman

Proceed with caution. That's the word among information systems executives, many of whom are planning to deploy a new wave of mobile computing applications in 1995.

Sparked by the corporate re-engineering craze and improved laptop computer technology and software, companies are increasingly replicating an in-office computer environment for remote workers. Now, with mobile computers making up about 20% of PC sales and Intel Corp. I486 horsepower built into many laptops, IS managers are working to give remote users the same levels of support and applications now available at desktop workstations. And using more powerful laptops, IS plans to mint brand-new, cross-functional applications that tap into multiple databases.

"We're going toward the virtual office concept, where you're able to compute anywhere from any location and access databases on demand," says Randy Giusto, associate director of mobile computing at BIS Strategic Decisions in Norwell, Mass. By the late 1990s, "MIS organizations will ask if you want a portable or a desktop," he predicts, "because you can't have both."

Early adopters of remote computing advise drawing up a policy that establishes some guidelines for handling remote workers and starting small with a few high-impact pilot programs.

At the Federal National Mortgage Association (Fannie Mae), 25 regional account executives nationwide are trying out a new set of applications that tap into the mortgage-lending organization's on-line Unix database systems. If successful, the year-old applications will be rolled out by 1996 to more than 200 staffers working remotely.

First, however, IS has to build up industrial-strength software that anticipates real-world conditions, Fannie Mae learned. "Many times, when you're trying to do connectivity over a voice line, you're going to get dropped," says Mike Williams, senior vice president of customer applications and technology integration at Fannie Mae's Washington headquarters.

But with a little planning, solutions can be found that prevent connectivity problems. "If you send across a big blob of data, you're likely to get cut off," Williams says. "But if you send multiple transactions across in sequence, you're more likely to be successful."

Extensive stress-testing by a small team helps make software applications street worthy before they ship to users, he adds.

Dunlop Tire Corp. in Buffalo, N.Y., is outfitting a small West Coast sales operation with remote-computing support for fewer than 10 people, says Chief Information Officer Dennis Courtney. The software, based on Oracle Corp.'s Financials order-entry system and remote electronic-mail links, will let sales staffers draft purchase orders from customer sites by mid-1995. If it goes well, the project will be expanded to other sales regions, including more than 75 sales representatives nationwide.

The greatest challenge for IS is planning and troubleshooting the remote computing technology, Courtney says. "It's getting the infrastructure in place to allow remote access and defining the IS job role to support people in the field," he explains.

Laptops were deployed, along with Microsoft Corp.'s Office software, to get remote workers accustomed to the new computing interface that will be used for the client/server order-entry applications coming in 1995. "By the time they have access to the information databases, our mobile workers will already know how to use the new technology," Courtney says.

Some senior managers still fret about managing employees who are out of sight and wonder how to ensure that they spend their time productively. But management consultant Tom Peters, who co-authored the book *In Search of Excellence*, says managers must learn to trust remote workers to do their jobs.

> "THE FIRMS THAT ARE SPYING AND COUNTING LOG-ONS ARE GOING TO SCREW IT UP, AND [THEY] DESERVE THEIR SORRY FATE. THEY'RE NOT GOING TO GET THE GREAT WORKERS."
> – Tom Peters, consultant

Electronic surveillance will not help matters either, Peters says. "The firms that are spying and counting log-ons are going to screw it up, and [they] deserve their sorry fate," Peters says. "They're not going to get the great workers, and they're not going to create interesting things. In an age when you create value by doing good stuff with your head, you can't go back to treating people like children."

Remote end users also need better help desk support, particularly with regard to communications links, experts say. Some companies have started outsourcing help desk support to broaden coverage for mobile workers, who often call for assistance at night or on weekends.

Help desks may need to be redesigned or placed inside business units, according to Kevin McManus, director of KPMG Peat Marwick's mobile computing practice in Radnor, Pa. "This technology requires a new IS infrastructure to support it," he says. "That should be figured out as the system is being put together so that the company isn't blindsided by the support requirements of operating [remotely] on an ongoing basis."

Even so, senior management has set the direction for more mobile workers, and IS must follow the strategy. "IS has to provide the connectivity and the necessary tool sets to allow the workers to do what they do in the office," says Gene Friedman, vice president of applied technology at Chase Manhattan Bank N.A. in New York.

Security is still a concern for central IS management. "I don't think it's ever possible to control 100% of everything," says Laraine Rodgers, former CIO at Xerox Corp.'s U.S. Customer Operations Division in Rochester, N.Y., and now vice president of IS at Bell Atlantic Corp. in Silver Spring, Md. But for many IS managers in industry, she says, "There is an anxiety about security on the network."

To combat worries about break-ins to corporate systems, many remote users log on to the computers at headquarters using a multilevel password. Many sites also require field em-

ployees to dial into a call-back modem as a way to verify user identity. Rodgers says some firms have decided to focus their security measures on key entry points in the network because all computers cannot be defended by IS.

Despite the concerns, the office is becoming a thing of the past for many employees. Illinois Central Corp., a Chicago-based railroad, recently closed down an Edison, N.J., office and effectively put four marketing representatives in New York and New Jersey permanently on the road.

"Many of our marketing people are now basically working from their homes," says Norman Schwarz, director of technical support at Illinois Central. "One person lives in Brooklyn," Schwarz says. "She's got a printer, a PC, a fax and phone numbers, and she's all set." Future applications — as yet undeveloped — will let such users waiting for a meeting at a customer site look up that customer's shipping profiles, Schwarz says.

Railroad mechanics at Illinois Central use a different kind of mobile computer than marketing reps; handheld devices record railroad-car repairs for scheduling on the company's IBM mainframe.

The hardest part

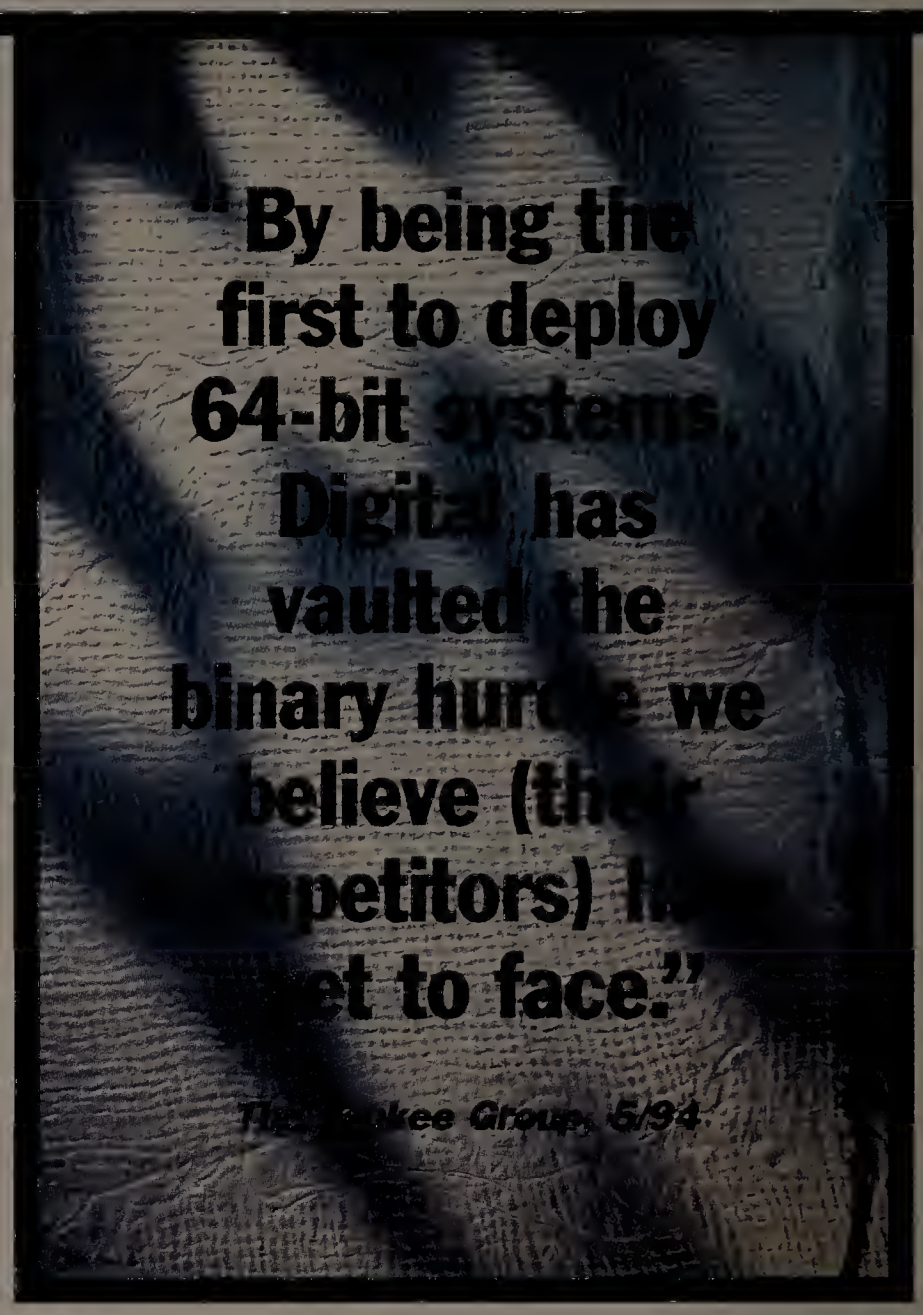
Sometimes the toughest hurdle when disconnecting the workforce from the office is breaking emotional links to working in an office environment.

Xerox plans to use laptops to keep its 4,000-plus sales reps on the road most of the time [CW, Oct 31]. Office time will increasingly be spent in common office spaces or even in a type of cubicle known as a telephone booth, says Sean Connellan, manager of strategic planning and operations support at Xerox's U.S. Customer Operations Division.

"When people are packing up their boxes, the notion is the office is kind of gone," Connellan says. "The reality hits them pretty hard." But while Xerox plans to reduce office space by 30% to 50% through its sales force automation plan, the office will retain its role as a meeting place. "The office is still there," he says. "They can still go into that building for support and to find a productive place to sit and work."✦



We think you *should* buy *our* UNIX system.



"DEC OSF/1 represents a new generation of commercial UNIX...with good functionality, efficiency, modularity, and plenty of room for growth."

D.H. Brown Associates, Inc., 6/94

But maybe you *should* get *a* second opinion.



©1994 DIGITAL EQUIPMENT CORPORATION. 1994. Digital, and the Digital logo are trademarks of Digital Equipment Corporation. UNIX is a registered trademark licensed exclusively by X/Open Company Ltd. OSF/1 is a registered trademark of Open Software Foundation, Inc. The Yankee Group quotes are from Yankee Watch: Commercial UNIX.

And *a* third.

And *a* fourth.



No matter how many expert opinions you get, they'll all agree: Digital's DEC OSF/1® is the ideal UNIX® offering for a broad range of businesses. Here's what the experts are raving about:

- Best standards compliance
- Outstanding reliability
- The highest-level availability
- Incomparable performance
- 64-bit Alpha technology
- Wide variety of applications

And, most importantly, no costly future conversions, because you're already where everyone else will be going.



So if you're looking for a UNIX system to grow with, put DEC OSF/1 on your short list.

It's a decision everyone will applaud.

To receive copies of these independent evaluations, call 1-800-DIGITAL. For more information, contact your Digital Business Partner or Digital.

digital™

This Time We Mean Business. May 1994. DH Brown quote is from "Digital's Hi-Low Drive." June 1994. Illuminata quote is by Jonathan Eunice. Originally published in Digital News and Review. © 1994 Cahner's Publishing Company. Used with permi

The Future: UNPLUGGED

Wireless buzzwords you've just got to know

By Michael Fitzgerald

Circuit-switched cellular
The analog voice network is broadly in place and has had time to have its kinks worked out. Circuit-switched cellular, which uses standard analog signals, is a better approach for long data files than packet networks. But it's set up to transmit from tower to tower, which means signals weaken toward the edges.
Pros: It's here now, it has broad coverage, and it works.
Cons: It's expensive, with lots of extra charges above the service charge; it has poor security and reliability.
Price: Depends on several factors but can cost 35 cents per minute to send a message regardless of length.

Cellular Digital Packet Data (CDPD)
It leverages carriers' experiences in building cellular voice service — meaning billing and interoperability issues such as roaming will be fixed. Digital technology sends bursty packets at up to 19.2K bit/sec. and builds on analog tower technology.
Pros: It has broad industry support, big backers throwing big money at it, a fairly low price and good mind share.
Cons: It's not here yet, it's overhyped, and it has questionable accessibility in high-use areas; it has unproven reliability and throughput.
Price: 12 cents to 19 cents per kilobyte (for GTE Corp.'s CDPD service), plus basic service rates. Users must also factor in roaming costs.

RAM Mobile Data/ARDIS
Packet radio networks. ARDIS is better at in-building transmission; RAM Mobile Data has more effective traffic optimization. Both have top speeds of 19.2K bit/sec., though most of the ARDIS network runs at 4.8K bit/sec.
Pros: They're here; they work; they're fairly inexpensive.
Cons: Coverage is limited, they're difficult to develop applications for, and long-term viability is a question.
Price: ARDIS charges 6 cents per message, plus 3 cents per 100 characters in prime time. RAM Mobile Data costs approximately 3.5 cents per message.

Metricom, Inc.'s Ricochet Microcellular Data Network
Operates in unlicensed 900-MHz band using a small, inexpensive radio transmitter; it is set up in a mesh configuration, so radio signals bounce to various transmitters rather than the point-to-point cellular network configuration.
Pros: Cheap, easy and fast.
Cons: Haphazard deployment; may never be nationwide.
Pricing: As low as 6 cents per minute, comparable to land lines.



Tapping in from the Road

Weave remote users into the corporate web by building on what you have

By Stuart J. Johnston

During mobile computing's Paleolithic period, back when it was still miraculous that users could communicate at all, the travails of being a user on the road were fairly basic. Often hotel telephones were hardwired, and traveling users had to improvise, carrying with them alligator clips, a screwdriver, pocket knife and maybe even an acoustic coupler for those really intractable situations.



Microsoft's Windows 95 will offer a Briefcase feature that lets users synchronize copies on a desktop hard drive and a laptop

Now, mobile users are not just expected to stay in touch with the main office; they must function as if they were in the office, even at an altitude of 35,000 feet.

Consolidating this vast information flow and making it easier to retrieve and respond to messages and other information from the road are definite trends for mobile users in 1995.

Boost from Windows 95

One trend that is certain is that much more of the technology for the information management task will be incorporated into the operating system in the next 12 months, specifically with the delivery of Windows 95.

When Microsoft Corp.'s 32-bit, pre-emptive multitasking, multithreading desktop operating system rolls out about midyear, it will come with several new features aimed at aiding the mobile user.

Most noticeable, perhaps, is Windows 95's universal electronic-mail client, called the Microsoft Exchange client. It will provide a focal point for mail from various E-mail systems — either the user's internal company system, a commercial service or the Internet. The Exchange client will also send and receive faxes. All of these will be consolidated under a single interface, making it simpler to check in.

Other features of the Exchange client also aim to simplify the information glut. For example, much like the facility currently available to Microsoft Mail users, Windows 95 will allow users to download just the header for Internet E-mail messages to decide which messages to read from the road and which ones to leave for later.

A version of Windows beyond Windows 95 will also let users collect voice mail from inside the Exchange client. Even further out, Microsoft plans to extend that capability to animation and video mail.

Another Windows 95 feature aimed at mobile users is the Briefcase.

The Briefcase will enable a user to transfer files from the hard disk on a desktop PC to a laptop and automatically keep copies of those files in synchronization. The user can work on the files from the road and, upon returning to the office, choose to keep different versions or overwrite the older files with the newer versions, says Rogers Weed, group manager in Microsoft's Personal Operating Systems division. While these capabilities are available today on advanced add-on products such as Traveling Software, Inc.'s Laplink, this is the first time such a feature will be incorporated in the basic operating system.

Plug and Play is a phrase that users will hear more often in the coming year. It refers to a hardware and software specification that enables conforming equipment to be inserted and removed from a system, and presto — it installs and deinstalls itself automatically.

For users of laptops who employ docking stations to let the same machine double as a portable and a desktop, Windows 95's Plug and Play support means the system knows when the PC is attached locally to a LAN and when it is not.

When the user is not attached locally to a LAN, Windows 95 will know how to dial up the LAN using Remote Access Services. The user's procedures will remain the same, no matter which type of connection is required. When the user returns to the office, Windows 95 will automatically re-establish the user's LAN connection.

Plug and Play also ensures that when the user begins to undock a laptop from its docking station, the machine will check whether the user still has files open on the docking station's nonportable hard disk or on the network. If so, it will prompt the user to close the files before undocking.

When Plug and Play-enabled printers with infrared sensors become available, a user with a Windows 95 laptop will be able to take advantage of such a printer merely by coming within range of the infrared sensors. An icon repre-

senting the printer would appear on the user's desktop, indicating that the printer was available.

Lotus' Notes

Making laptop computers into more full-function communications appliances is one way of empowering telecommuters. However, users may not always have their portable PCs handy.

Cambridge, Mass.-based Lotus Development Corp. announced two services in late 1994 that may help in those circumstances.

First, it announced the availability of Version 1.1 of its Notes Pager Gateway, which now lets a Notes application send a message to most pagers supported by the major pager systems vendors, says Chris Wraight, Lotus' director of marketing for mobile computing. A similar gateway, which shipped in September, lets CC:Mail users send pages as well.

"What's coming [in the future] is two-way paging, [which would] enable you to scroll down through a list of prestored responses and send it back," Wraight says.

The company also recently released its Mobile Phone Notes E-mail Reader, which enables a user to call in and have E-mail read back over the phone via voice synthesis, Wraight says.

"Another thing we're doing for mobile users is making it easier to do replication. Now, you have to dial in to multiple servers, [but] in Notes 4.0, you'll only have to dial one server," Wraight says. Notes 4.0 is due about midyear, he adds.

"Some other things we're working on [for Notes 4.0] is full replication of Notes databases over analog cellular and digital wireless [links], including CDPD," Wraight says.

Users of CC:Mail Mobile for Windows have not been left out either. It "allows you to set up an icon, say, labeled 'home' or 'hotel' so that it can dial using an 8 or a 9 [access number] so you don't have to remember modem strings," Wraight says.

Novell's GroupWise

Not surprisingly, at least one Lotus competitor is working toward delivering many of the same capabilities to mobile users.

Novell, Inc. is already shipping wireless support in its GroupWise product, which "goes beyond E-mail" to provide calendaring, scheduling and task management, says Stewart Nelson, vice president of research and development for GroupWise.

The Provo, Utah-based company also recently began shipping its Telephone Access Server. "From any telephone in the world, I can have my E-mail, calendar, schedule and tasks read to me," Nelson says. Users can reply to messages as well, sending a voice message as an attachment to an E-mail response.

"Basically, you can do anything from a telephone now that you could do from a laptop in the past," Nelson says. Novell also offers a paging capability similar to that offered by Lotus.

In the next year, Novell will provide remote and mobile users with the ability "to go into a document management server and have [a document] sent to me via fax or downloaded," Nelson adds. Although he did not go beyond generalities, Nelson says the company will also "be doing some things with discussion databases like [Lotus'] Notes."

No matter what else happens in 1995, it will be harder for mobile users to beg off on work tasks that they previously needed to be in the office to perform. ✦

The Totally Wired Road Warrior

To boldly go where no executive has gone before without missing a business opportunity

Today's mobile executive never has to be out of touch with the office if arms, back and budget can stand the stress.



Wireless phone
Rolmphone 900 wireless system from Siemens Rolm Communications. Intended for users at a local site who want access to a PBX without a wire. Price: $1,500 and up.

Pager
Pagenet Advisor includes four-line message display. Price: $24.95 per month, including service.

Portable printer
Hewlett-Packard DeskJet 320 prints 300 by 600 dot/in. at 3 page/min. Color kit and battery optional. Price: $369.55 at Computer City.

Laptop
Texas Instruments TM 4000M multimedia portable includes a 75-MHz 486DX4 processor, 4M bytes RAM, a 455M-byte hard disk, a 9½-in. passive-matrix color screen, 16-bit sound, a PCMCIA slot. Price: $4,799.55 at Computer City.

Portable modem
Ericsson GE Modibem. 6K to 8K bit/sec. with RAM Mobile Data wireless messaging service. Price: $398 plus $89/mo. for unlimited two-way messaging.

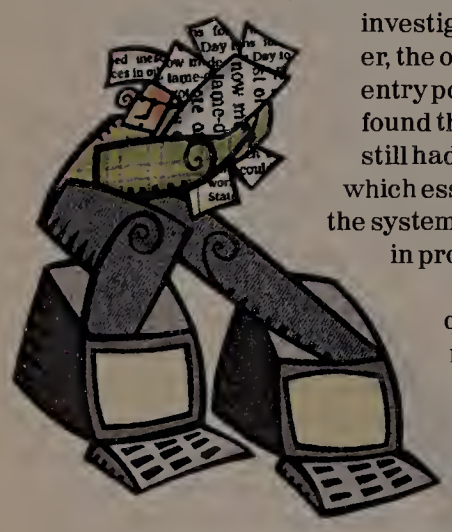
Photo by Russell Quackenbush. Laptop and printer courtesy of Computer City. Other equipment courtesy of manufacturers.

The Stuff of Nightmares...

Remote access poses security risks that will keep you up at night

By Suruchi Mohan

A reporter, fired from a newspaper in Florida, went to work for the competition. Shortly thereafter, the new newspaper began scooping the old one on local events that the old newspaper had been investigating. A few scoops later, the old newspaper looked at entry points to its network and found that the fired reporter still had access privileges, which essentially let him slip into the system and preview all stories in progress.



A computer hacker requested a vanity phone number from the phone company. He deliberately chose a number that was the same as a major bank's online dial number — with the last two digits transposed. He then designed a screen identical to the bank's dial-in screen. When users dialed the bank's number incorrectly and got the hacker's screen, they unsuspectingly entered their identifications and passwords. At that point the hacker's system sent them a message saying they would have to redial because the bank was unable to process any transactions. The hacker, meanwhile, had recorded the information for his own use. He bragged about it on a bulletin board and was caught.

Two companies were competing for a large contract. An executive at one of the companies kept the bidding information on his laptop, which one day mysteriously disappeared. No other computer in the office was stolen and no other computer held that information. Although there was no clear evidence that the competitor had a hand in the laptop's disappearance, the coincidence was suspicious.

About time security shapes up

These types of stories from consultants, rushed to the crisis scene by distraught company executives, go on. Many companies continue to be lackadaisical about dealing with the unusual security problems posed by networks that are accessed remotely.

But information systems managers and consultants agree the security issue is growing more acute as more corporate data is stored electronically and accessed remotely.



"Remote access is probably the single most important issue" to system security, says Bill Aerts, information security consultant at Burlington Northern Railroad Co. in St. Paul, Minn. At his company, management wanted more modem lines, but Aerts refused, saying the network is already large and he lacks adequate tools to monitor it. With more modems, it would be impossible to track all the remote dial-up lines, he says.

Requires a lot of hard work

Maintaining security is a grind-it-out, labor-intensive chore, particularly in the client/server world.

"The issue is not dial-up access. You have to support that," says Charles Wood, an independent systems security consultant at Information Integration Investments in Sausalito, Calif. "The question is, how will you secure it for a particular environment? Each firm will have to do it on its own as there are no off-the-shelf products," he says.

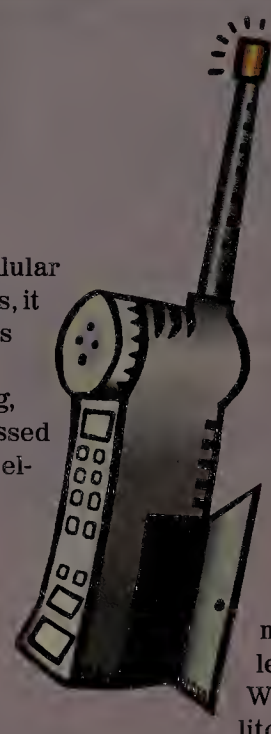
Wood adds that although they're not inherently security averse, modems do leave large

WHO'S LISTENING?

Wireless data transmissions can be secure

By Mitch Betts

Given the headlines about the embarrassing tapes of cellular phone calls made by Princess Diana and other notables, it should be obvious that cellular phone calls are about as confidential as a radio talk show.



In fact, experts say sensitive business topics such as bidding, pricing and legal or financial strategies should never be discussed on cellular phones unless the traffic is encrypted. Otherwise, cellular conversations can be plucked out of the air by scanners that cost as little as $99.

Unfortunately, these alarming reports may be scaring network managers away from a new breed of wireless data networks that have surprisingly robust security.

The coming year will see the deployment of wireless networks based on Cellular Digital Packet Data (CDPD) technology.

"CDPD will take off in 1995 and provide an element of security that has not been available before," says Phil Evans, director of telecommunications planning at Perot Systems Corp. in Richardson, Texas.

For starters, CDPD traffic is hard to monitor because it is made up of packets of data, which fill in the gaps of voice traffic and hop among different frequencies before being reassembled. That kind of setup makes it hard to isolate on a scanner.

But there's more. CDPD modems scramble the airborne data using public key encryption from RSA Data Security, Inc. in Redwood City, Calif. They also provide a frequently changing identification number for the user's device to thwart hackers who capture ID numbers.

On top of that, corporate network managers can add their own security measures, such as adding encryption for the land-line portion of a call or building a firewall, which is a router with access-control software that protects internal corporate networks.

Another recommended approach is to beef up the security of wireless networks by adding smart cards to the digital device for user authentication. For example, the SecurID card from Security Dynamics, Inc. in Cambridge, Mass., produces a different user ID code every 60 seconds.

Similarly, the new PersonaCard 100 will be available in January from National Semiconductor Corp. in Santa Clara, Calif. The $250 card, which plugs into a PCMCIA slot on desktop and portable PCs, handles user authentication, encryption and digital signatures.

But the wireless world still needs better network management systems so network administrators can monitor the wireless traffic and spot suspicious activity, says Charles Cresson Wood, an independent information security consultant in Sausalito, Calif.

One of the scarier predictions for 1995 comes from M. E. Kabay, director of education at the National Computer Security Association in Carlisle, Pa. Kabay predicts that some company will start sending credit-card numbers over wireless networks — without taking enough security precautions — and get stung by a massive credit-card fraud. A hacker need only record the wireless data traffic and use pattern-matching software to identify credit-card numbers.

That, Kabay says, will make October's $50 million toll fraud, where an MCI Communications Corp. employee sold 60,000 calling-card numbers to a crime ring, seem like small potatoes. ✦

holes in the network if not properly secured.

"Modems pose a security risk [because] you put the attacker closer to the system," says Ken Cutler, vice president and director of the Information Security Institute in Woodbridge, Va. Many companies still do not have baseline security measures in place, he says. These include password management, strong control of privileged authority, audit trails of failed log-in attempts and authorization for a minimum of people who can modify data on the network.

Wood agrees. "You'd be surprised," he says. Even companies that seem to be well managed lack basic security measures. Sometimes the measures are in place theoretically, but there is no compliance.

Expensive but worth it

Challenge-response is one of the more sophisticated procedures that some companies are implementing to reduce the risk of unauthorized entry, says Ray Pickholtz, professor of electrical engineering and computer science at George Washington University in Washington. Users are given a handheld device into which they insert their personal identification numbers (PIN). The device generates a one-time password that is sent by the remote computer to the host, which then sends a query back to the remote user. The PIN never goes over the phone line.

These systems, though effective, are expensive. The up-front fee for an access control device ranges from $10,000 to $15,000. This device sits "in line" between the user and the machine. Cards are an additional $50 to $150.

In a study Wood conducted of 40 of the largest commercial banks in the U.S., he found that 89% of respondents were using extended user authentication, which means more than a mere password. Of these, 57% were using identity tokens; 27% were using callback.



Although more secure than a permanent password, challenge-response is not foolproof, Pickholtz says. A disgruntled network administrator who has access to all the PINs can manipulate the system. In fact, employees or former employees — like the newspaper reporter — have the potential to be big hazards to organizations not alert to security needs.

"Usually, the weak points are not sophisticated tools but disgruntled employees or just a friend getting together with somebody," Pickholtz says.

Companies have to be especially careful when firing technologically savvy network managers. Wood cites a company that called him in to change all the router and computer addresses on its network as a high-profile network manager was being escorted out the door. But most companies are not so quick to head off that kind of problem.

Viruses more of a threat

Not that vindictive individuals are the only ones who cause damage. The threat of computer viruses has worsened as more users connect to on-line services and carry disks back and forth between home and office, says Barry White, manager of IS auditing at Johns Hopkins University in Baltimore. The risk is especially grave when people travel abroad with portable computers and exchange disks with the local population. These disks often contain viruses. In one instance, a virus scanning program detected 30 viruses on a system belonging to a professor who had just returned from abroad.

Finally, as the case of the missing laptop illustrates, users of portables must be careful. "A year or two ago, [portables] were being stolen because they were novel; now, [it's] because of the information they have," Aerts says.

From the corporate perspective, all portables should be accounted for by the company, Cutler says. For individuals, preventing theft of hardware or data is a matter of common sense. Users should not leave computers lying around, and they should use data encryption techniques for all their data. Users should also be aware of people who might be shoulder surfing, he says.

Shoulder surfing is fairly common in airplanes, and all users need to be aware of it. LCD laptop screens are visible from several rows back on an airplane. Cutler says once when he was working on a proposal on a plane, a passenger sitting several rows behind told him his work might sound better if he changed the wording a little.



Overall, computer security is a cops and robbers game — the better equipped the cops are, the smarter the robbers get. But as in everyday life, IS managers can reduce the risk of attack with common sense.✦

Home Alone

How companies are handling their work-at-home employees

By Jaikumar Vijayan

A sampling of corporate policies on home computer use shows some broad guidelines for work-at-home computer users and a lot of flexibility. Some major similarities in corporate policies include the following:

- Most work-at-home requests are handled at the department level.
- The number of employees working at home at least once a week cannot be easily identified, managers say, because it varies and is not tracked.
- System entry is typically governed by password identification, and employees have access to most of the same applications and software they have at work.
- Companies typically reimburse employees for hardware, software and the communications required to work from home.

PRICE WATERHOUSE in New York is one of the nation's top accounting and consulting firms.

"We want to be more flexible with our workforce by allowing them to work when they want to," says Sheldon Laube, national director, information and technology.

- The company provides computers to all employees approved by managers to work from home.
- The company has negotiated agreements with software vendors that allow users to use most company-licensed software at the office and at home.
- Users can dial into the corporate LAN in a variety of ways, such as through Shiva Corp.'s LAN Rover or via Notes. Access is governed by passwords. The company pays for required software and hardware.

PRINCIPAL FINANCIAL GROUP is a financial services firm in Des Moines, Iowa.

"Like any other company perk, the alternate work hours plan is an additional benefit [that accrues] over time for eligible employees," says Leslie Peckham, technology development analyst, pension business unit.

- An estimated 500 out of 6,500 eligible employees have at some time worked from home.
- Users can dial in remotely to their office desktops using specially configured versions of Symantec Corp.'s PCAnywhere software. To get into the corporate LAN, a user's access request is routed to a communications server that identifies and verifies the request.
- The communications server is operated by corporate auditing and control.
- In addition to identifying themselves to the server, users must pass redundant security checks to gain system access.

MILES CORP., a division of the German firm Bayer AG, is a conglomerate based in Pittsburgh.

"I see an emphasis on mobility. A lot of the orders we are placing right now are for notebooks and laptops with a lot of horsepower, larger hard disks and full software suites," says James Baehr, manager, communications, technical procurement and services.

- No formal telecommuting policy is in place yet, but Miles is investigating setting one up. So far the company has worked on a case-by-case basis. When an employee is on maternity leave or disabled, Miles makes arrangements for that employee to work from home.
- Miles looks for licensing agreements that let company software be used at home, provided another copy is not in use at the same time.
- Security is ensured by requiring remote users to input matching parts of a precoded algorithm.

BURGER KING, INC., one of the country's largest fast-food chains, is based in Miami.

"So far we have seen little reason why people need to work from home, except in certain specialized instances," says Aijaz Nawdhia, LAN administrator.

- Users get dial-in access to their office desktops through ReachOut communications software from Stac Electronics, Inc.
- Home users can run all of the software and applications available on the desktop and access the corporate server.
- The server can also be accessed through Notes and Shiva's LAN Rover.
- Rumba from Wall Data, Inc. allows home users to work in a mainframe-like environment if required.

KENNAMETAL, INC. in Latrobe, Pa., is a multinational manufacturer and distributor of carbide cutting tools with locations in North America, Europe and Asia Pacific.

"There is no formal policy for work-at-home users. It is under each manager's control. If people want to work at home, we give them computers," says John Smith, manager, end-user computing.

- All work-at-home users are equipped with company-owned hardware and communications software.
- Kennametal sales staffers and other employees make use of laptops and notebooks. The company recently purchased 450 Pentium-based laptops.
- Employees access servers through dial-up modems and a dedicated Integrated Services Digital Network line.
- When necessary, the company also installs or pays for phone lines.

Illustrations by Ellen Prochnik





WHAT KIND OF

e call the SPA to turn in

EVIL-MINDED

illegally copying software,

SCHMEBALL

ecause they know that when

REPORTS THEIR

nest people steal software, the rest of

SMALL BUSINESS

nd up paying for it. Copying software

COLLEAGUES FOR

is a crime. To clean up your software, or

ILLEGALLY

report someone who should, call

COPYING

1-800-388-7478.

SOFTWARE?

SOFTWARE PUBLISHERS ASSOCIATION

DON'T COPY THAT FLOPPY.™

©1994 Software Publishers Association

Letters to the editor

A few more tips on 'Breaking the news'

Downsizing isn't an event; it's a new corporate culture. "Breaking the news" [CW, Nov. 28], which presented tips for telling staff members about a corporate downsizing, was excellent but covered only the tip of the iceberg. Downsizing goes beyond management and requires new leadership; your company will never be the same.

The best advice is to ensure that the announcement isn't news to anyone. Downsizing should be preceded by a solid human resources system that sets performance goals for employees and provides results-oriented appraisals. In most cases, corporate survival means that management must share more information with employees as soon as possible. Those who leave will better understand the situation, and those who stay will sense a greater corporate ownership as members of the new post-downsizing "team."

Steve Edens
The Computer Group/USConnect
Columbia, S.C.

Think again

Charles Babcock tells us that "Object developers should think Small" [CW, Nov. 7]. I would suggest that readers consider the following relative weaknesses in the Smalltalk programming model:

- Smalltalk falls short in multiple-person projects and interfacing to external hardware.
- Making on-the-fly modifications in Smalltalk does not promote rigorous testing, which puts the burden of finding the bugs on the customer.

From an engineering perspective, it seems the corporate world would need more discipline than Smalltalk provides.

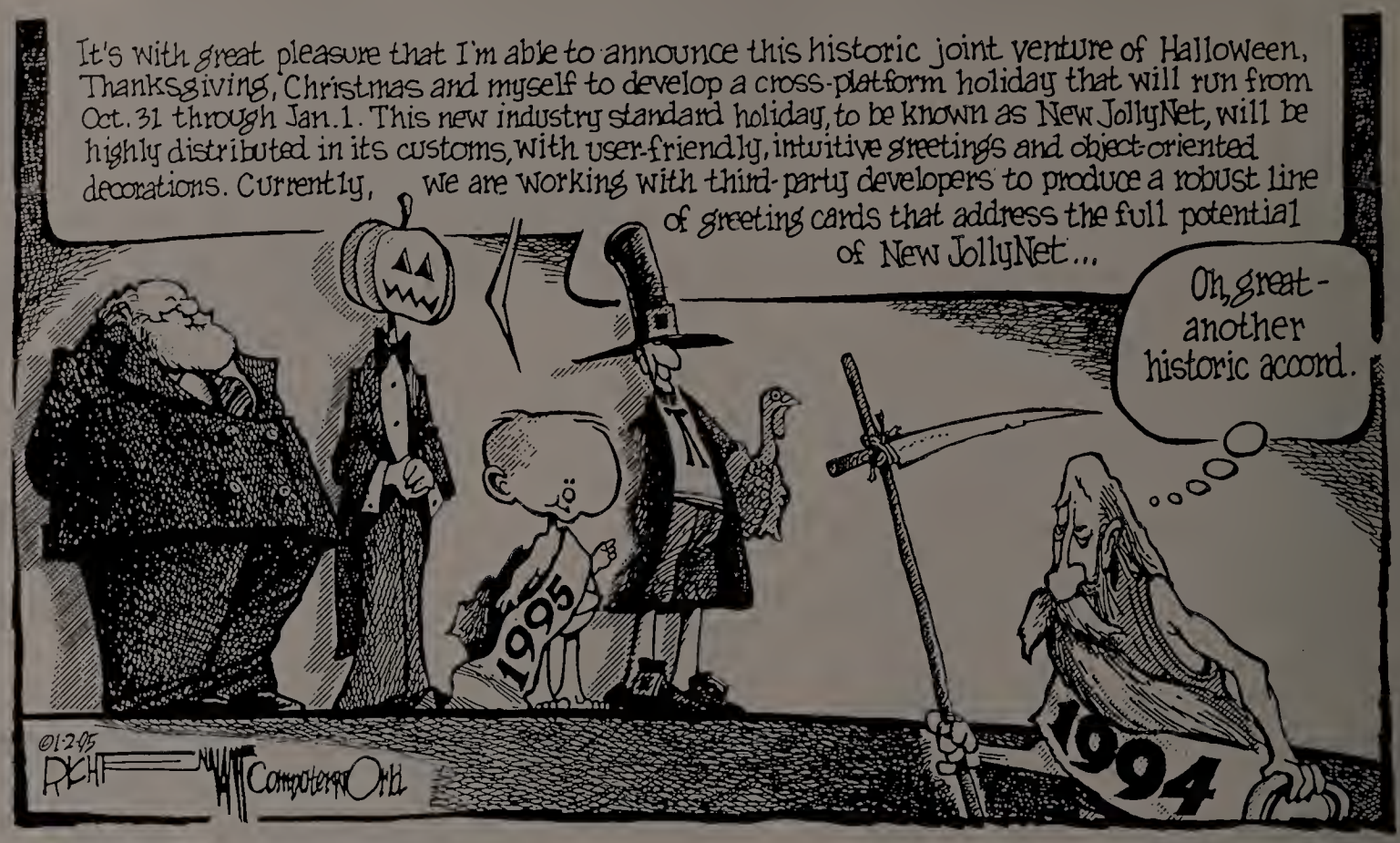
Paul Pukite
Minneapolis

Don't be fooled

The last line in "Tool time" [CW, Nov. 21] — "A fool with a tool is just a faster fool" — is the most telling. Experienced people with sound business process re-engineering methods can succeed with the most basic tools; the best re-engineering tools in the world can't overcome bad methods.

It has been my experience that the greatest savings from re-engineering come from improving the way the organization carries out its mission and not from new programs.

L. Joseph Dunn
Burbank, Calif.



Breach of contract?

"Unsafe at any speed" [CW, Dec. 5] indirectly questions whether Intel might be liable to its customers for damages.

In fact, under the Uniform Commercial Code (UCC) and most states' enactment of it, a consumer has certain rights accrued through purchasing a good from a vendor, including an implied warranty that the good will do what the vendor says it will do. Failure would be considered a breach of the implied warranty.

The consumer is generally prohibited from waiving this right. Many vendors attempt to throw language in their preprinted warranties to eliminate the rights under implied warranty; the UCC generally does not allow such language to be effective.

The real issue is whether a vendor would knowingly sell a defective product. With deception by a vendor, the concept of "strict liability" would apply, exposing the vendor to liability for consequential as well as direct damages.

It is like a hypothetical automobile manufacturer producing a truck known to explode in an accident and deciding it is cheaper to pay off the few informed consumers than fix the problem.

Does this apply to Intel's decision-making? Good question!

Gerald L. Clarke
Boston University
School of Management
Boston

Bugs are here to stay

Hypothesis: The Pentium bug is a sign that from now on, all chips will have bugs. I suspect that Pentium and other chips have crossed the threshold of complexity; from now on CPU bugs will be a fact of life, just as operating system bugs have long been accepted as a fact of life.

The issue now is not "How do we make CPU chips bug-free?" but "How do we manage our lives involving CPU chips with bugs?"

Isaac Malitz
Sherman Oaks, Calif.

Be careful what you ask for

Your enthusiasm for the Republican victory ["High-tech execs, IS shops cheer GOP takeover, plans," CW, Nov. 21] misses some important points. Workers in rural America may provide nice cheap labor for assembling computers, but if Newt Gingrich has his way, they will soon be locked out of the information highway.

Republican rhetoric may sound like information for all, but what it means is information for those who can pay for it. And you can be sure the price will be high enough to keep out "undesirables," such as students at public universities and many middle-class workers. Voters are going to get exactly what they voted for, but it will not be what they expected.

Jay Putt
Hauppauge, N.Y.

Strained relations

Charles Babcock missed the mark — substantially — in "OLAP leads the way to post-relational era" [CW, Nov. 21]. In his blithe broadside on relational databases, he demonstrates that he not only has no idea what relational databases can do but also proves that he doesn't even know what they *are*.

Relational databases are the only databases that have even a theoretical foundation to build on. Thanks to the work of industry pioneers such as E. F. Codd and C. J. Date, the relational theory has been hammered out and refined, and the databases have been built on top of it. No other principle of database design can make that claim.

Roger B. Thomas
Port Huron, Mich.

I hope readers will resist the temptation to rush out to purchase the latest software version of cold fusion.

We continue to believe that somehow software will defy the laws of physics and produce more output than there is input. The total number of brain cells used on design and CPU cycles used to store the data is equal to the amount of effort and CPU cycles used to get it out.

The failure of current relational systems is not in the systems but in the data design. If you won't design relationships into your data up front, then you either have to overpower the bad design with CPU cycles or go out and buy a front-end, multidimensional, object-oriented database reporting system to superimpose the relationships on your messy data.

Charlie Dietz
East Hanover, N.J.

BEST COMPUTER NEWSPAPER 1992, 1993
COMPUTER PRESS ASSOCIATION

■ Computerworld welcomes comments from its readers. Letters may be edited and should be addressed to Bill Laberis, Editor in Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

COMPUTERWORLD

Editor in Chief
Bill Laberis
Editor
Paul Gillin

News Editor
Maryfran Johnson
Sections Editor
James Connolly
Assistant News Editor
Patricia Keefe
Assistant Sections Editor
Johanna Ambrosio
Technical Editor
Charles Babcock
Senior Editors
Craig Stedman, Large Systems
Ed Scannell, PC Software
Michael Fitzgerald
Mobile Computing
Rosemary Cafasso
Client/Server Software
William Brandel, PC Software
Laura DiDio, Networking
Mid-Atlantic Bureau
Thomas Hoffman, User Strategies
(201) 587-0090
Julia King, Management
(215) 532-7599
Washington, D.C., Bureau
Mitch Betts, Social & Legal Issues
(202) 347-6718
Gary H. Anthes, Government & Security
(202)347-0134
West Coast Bureau
Jean S. Bozman, Open Systems
Kim S. Nash, Databases
Steve Moore, Networking
(415) 347-0555
Midwest Bureau
Ellis Booker, Networking
(708) 827-4433
Pacific Northwest Bureau
Stuart J. Johnston, PC Software
(206) 641-7770
Senior Writers
Mary Brandel, Neal Weinberg
West Coast Bureau
Mark Halper, Suruchi Mohan
(415) 347-0555
Staff Writers
Stephen P. Klett Jr., Jaikumar Vijayan
New Products Writer
Tim Ouellette
Research Coordinator
Stefanie McCann

Features Department
Senior Editors
Michael L. Sullivan-Trainor, CW Guide
Joseph Maglitta, Corporate Strategies
Lory Zottola Dix, In Depth
Allan E. Alter, Management
Kathleen Gow, In Depth
Associate Editors
Jodie Naze, Careers and Marketplace
David B. Weldon, Management
Cathleen Duffy, CW Guide
Senior Researcher
Kevin Burden, Firing Line/Scorecard
Assistant Researcher
Erin Callaway, Resource Center
Fluegelman Intern
Renee Barber

Special Projects Editor
Bruce Rayner
Managing Editor, Special Projects
Joyce Chutchian-Ferranti

Senior Research Manager
Bob Fink

Chief Copy Editor
Anne McCrory
Assistant Chief Copy Editor
Christina Aicardi Maguire
Senior Copy Editors
Kimberlee A. Smith, Jill Zolot
Ellen Fanning
Copy Editors
Michelle J. Keyo, Jay F. Rizoli
Kimberly Gilliard, Michelle Grabon

Design Director
Tom Monahan
Senior Graphic Designers
Nancy Kowal
Mitchell J. Hayes
Design Assistant
Janell Genovese
Graphic Designers
Stephanie Faucher, Mary Beth Welch
Cartoonist
Rich Tennant

Office Manager
Linda Gorgone
Editorial Assistants
Lorraine Witzell, Connie Brown
Aleksandra Skulte
West Coast Bureau
Chris Flanagan

Computerworld Client/Server Journal
Alan Alper, Editor
Catherine McCrorey, Managing Editor

Electronic Marketplace Liaison
Lisa Davidson

Rights and Permissions Manager
Sharon Bryant

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
(508) 879-0700
TDD: (800) 428-8244
MCI Mail: 279-6273
CompuServe: 76537,2413
Subscriptions: (800) 669-1002

IS vision 2000: Dancing to the new beat

Patricia B. Seybold

In five years, we'll herald a new millennium. As information technologists, we share a collective vision of how our businesses will be transformed. When we were kids, we were indoctrinated by images of wristwatch walkie-talkies, computers you could converse with and "Beam me up, Scotty." So far, only the latter seems to be eluding our current technological prowess. What can we extrapolate about how information technology will affect us within the next five years? And how do we prepare for that future?

We know our organizations will have fuzzier boundaries. We'll be linked electronically to eustomers and suppliers. We'll be sharing research and doing product development with business partners and even with competitors. Our customers will shop electronically, browsing on-line malls and submitting requests to electronic brokering services that will supply appropriate alternatives tailored to their needs, tastes and pocketbooks. As the third world comes on-line, new global markets will open up, spawning new sources of innovation and creativity. We'll work from home, from electronic "vacation" homes, planes, trains and automobiles. We'll collaborate electronically with globally dispersed colleagues to develop new concepts, invent new products and propose solutions to complex global problems.

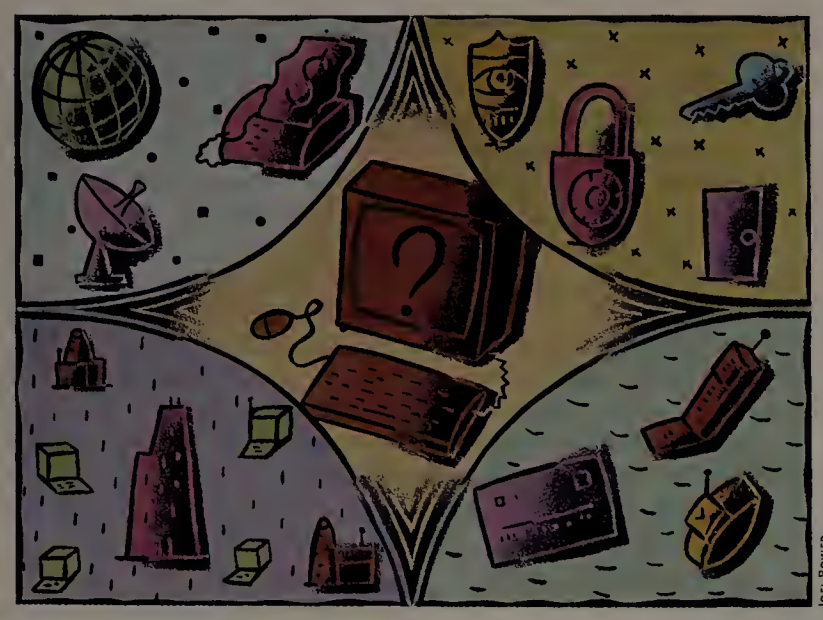
How will we get from where we are today to this brave new interactive world?

Here is the four-step dance I see in our collective future.

Step 1: Mastering personal productivity. We'll use an assortment of information appliances and applications to interact with one another. PCs with more intuitive user interfaces, personal digital assistants, videophones, smart cards, personal game machines, interactive TVs, intelligent watches and some devices we haven't heard of yet. The real trick will be in mastering several of these devices so that they really save us time, not squander it. It is unlikely that a single, integrated appliance will become the de facto standard in the next several years. There are too many different form factors, purposes and markets to satisfy.

What will be required to keep us all from going nuts will be seamless interfaces among multiple appliances. We'll need intelligent agents to coordinate our electronic calendars with our to-do lists, to synchronize our personal Rolodexes with our contact databases and to send and prioritize our electronic communications. We'll need gophers and knowbots to scour the Internet and dig up critical resources. Ours will be a mobile and interconnected workforce. From ditch diggers to social workers, from grape pickers to CEOs, from manufacturing workers to city planners, we'll be reachable by mobile phones, pagers and other devices. We'll need to become masters of peace and quiet, carving out interruption-free time and space for ourselves at home, at the office or on airplanes.

Step 2: Weaving the electronic Web. The global Internet frenzy is a prerequisite step for the next millennium. Companies and countries that are not connected to the Internet will miss out almost entirely on the next global economy. That's why there's such a preoccupation with getting connected. It's like any gold rush. Young men and women are plunging onto the frontier from all parts of the globe: Nigerians, Malaysians, Brazilians, Hungarians, they're all out there — staking their claims, setting up their own roadside attractions. The Internet is the great equalizer. It offers equal access to the information elite and the previously disenfranchised. It provides a wealth of resources and knowledge — enough to give any smart youngster (or oldster) the keys to the information economy.



JOEL BOWER

It is unlikely that any corporate or government regime, no matter how autocratic, will restrict Internet access for long.

Step 3: Taming the electronic frontier. The Internet and the World-Wide Web provide both the context and the conduit for the next economy. Electronic markets will flourish. Fears of hackers, outlaws, invasion of privacy, security breaches and instability are well-founded. But like any frontier, the Internet will succumb to civilization and privatization, hopefully without losing too much of its natural spontaneity and creativity. The key missing elements, at this point, are encryption, security and authentication services. These will be offered by a variety of parties (Netscape, Commercenet, America Online, Digital, Microsoft and so on). Making the Internet safe for electronic commerce will be our first priority, and it's a readily attainable goal. Remember, the Internet is a network of networks. Some will be commercial quality networks with adequate security and built-in credit-card authorization and encryption. People who want to play it safe will stick to those better policed highways for business transactions and stray to the scenic routes when they are in the mood for adventure.



When we were kids, we were indoctrinated by images of wristwatch walkie-talkies, computers you could converse with and "Beam me up, Scotty."

Step 4: Designing the interactive enterprise. Now is the time to get your company prepared for the next millennium. By the year 2000, your business will consist of a core knowledge base at the hub, supporting a small set of core business processes. As you transact business with your customers, and they with their customers, the details of those transactions and the qualitative information you glean from your relationships with one another will form the foundation of your corporate knowledge base. Patterns of usage, market trends, cultural preferences and local practices will be captured, analyzed and discussed.

You'll need robust distributed transaction processing applications, so you should be migrating to those new platforms today. You'll also need distributed, replicating data warehouses to support the decision-support and business intelligence applications your stakeholders will want to run against your core data. In addition to accumulating the facts, you'll be accumulating qualitative information, refining the shared mental model of your business.

So begin the design of your qualitative shared knowledge base, using tools such as Lotus' Notes or other document database/conferencing platforms. Link these qualitative and quantitative information bases together and add modeling and simulation tools to enable your employees to plan future strategies based on the changing patterns in your collective knowledge bases.

For capturing and refining business processes, look for business process templates to come on the market in the next couple of years — customer service processes, global manufacturing logistics processes and health event tracking processes. These will be comprised of business objects and business rules that can be easily customized to reflect the changing conditions in your business. These business process templates, customizable business rules and reusable business objects will enable rapid development of distributed applications. So now is the time to codify your business processes and implement them using flexible, easily modifiable technology.

As with any dance, there are lots of variations. But, if you begin your strategy with these four basic elements and weave your own variations around them, you'll be waltzing (or foxtrotting) into the future. Let's listen to the music and boogie on into the next millennium together.

Seybold is president of Patricia Seybold Group in Boston. Her Notes address is Patricia Seybold@ PSOCG. Her Internet address is PSeybold@ PSGroup.com.

Ease of use on tap for '95 applications

By William Brandel

Componentization. Object Linking and Embedding (OLE). The information superhighway. It's all been hyped in 1994, and some of it may even reach the desktop in 1995.

The bottom line for desktop managers is that by the end of 1995, they can expect applications more suited to making their lives easier. Bells and whistles are out; easy-to-use and network-compatible are in.

The market dictates this change. Desktop applications make up such a large chunk of Microsoft Corp.'s and Lotus Development Corp.'s desktop software sales — and the competition is so heated — that easy-to-use is a better marketing feature than, say, pivot tables.



New technology slated for 1995 will help in this regard. This includes object-ready operating systems such as Microsoft's Windows 95, new versions of IBM's OS/2, as well as the Taligent operating system from IBM, Hewlett-Packard Co. and Apple Computer, Inc.

Changing desktop

Windows 95, the next version of Windows, promises to be the biggest technical factor affecting desktop applications. Already under development, 32-bit suites from Microsoft and WordPerfect, Novell, Inc.'s Applications Group, are promised within 90 days after Windows 95 ships. Lotus has been hazy about the ship date for SmartSuite for Windows 95.

"The exciting stuff is true multithreading," said Jesse Berst, editor of "Windows Watcher," an industry newsletter in Redmond, Wash. When vendors start multithreading all their major functions, "we'll see some great improvements in application functionality," he said.

However, Berst noted that the first round of applications will concentrate on just the basic compatibility with the Windows 95 specification. Included in this will be a different, but new graphical user interface for the operating system and the applications that run on it.

"It includes features that will make Windows 95 easier to use," said Jean Summer, systems coordinator at Barclay's Bank in New York. Summer said she expects this aspect to reduce her training and support costs.

Windows 95 and Component Integration Laboratories' OpenDoc will eventually enable users to build applications out of components. But again, these functions will most likely be merged within the application suites in 1995. For example, Microsoft Office users will use one spell checker for all applications in their suite. Today, Office consists of four applications that use a common user interface and menu system.

Seal of approval

Perhaps the most notable change in applications will arrive late in 1995: Applications will have to support a modicum of OLE 2.0 functions to gain Windows 95 certification. These include drag and drop and OLE automation. Any site capable of writing Microsoft's Visual Basic macros will be able to integrate Windows 95 applications. The same could be expected if any applications that support OpenDoc or Taligent find their way to users.

Applications in 1995 will also have much stronger network connections for both end users and IS managers. In the beginning of the year, Microsoft, Lotus and WordPerfect will deliver hypertext links for their word processing applications. With these, users will have much greater manipulation capabilities over documents that are pulled from the World-Wide Web on the Internet.

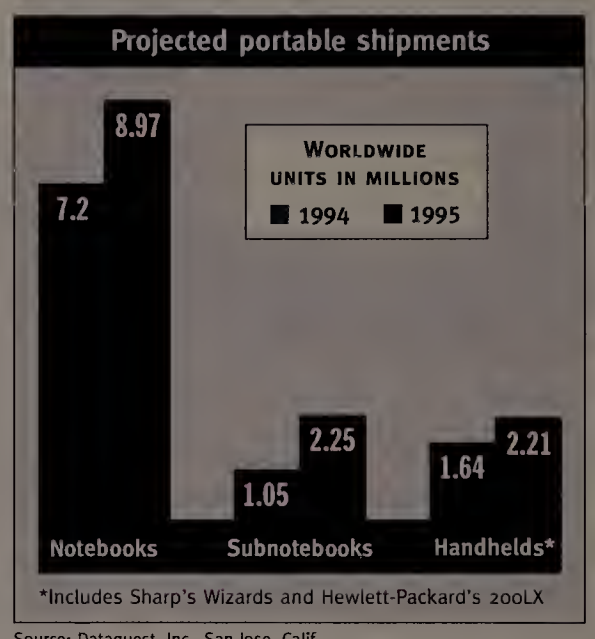
Managers get a network perk as well. Windows 95 includes a bevy of new interfaces that will allow network managers to control end users and peripherals on the network. And with Novell and Microsoft each working on Windows 95 requesters, network managers can expect to make those connections as well.

Features fuel notebook market

By Michael Fitzgerald

If the market for portable computers read like a stock chart, losers would outstrip gainers for 1995, prognosticators say.

This bodes well for users. Features are expected to increase while weight and prices decrease.



Source: Dataquest, Inc., San Jose, Calif.

"There's a lot of hot stuff happening in the high end," said Randal Giusto, a senior analyst at BIS Strategic Decisions in Norwell, Mass. He cited Pentium chips, lithium ion batteries, 800-by 600-pixel displays and screens larger than today's 10.4-in. maximum. Giusto also predicted that notebook pricing "will continue to erode. There will still be $4,000 notebooks, but I don't know if there will be $8,000 notebooks towards the end of 1995." Some high-end models currently cost more than $8,000.

As for weight, "it's idiocy to think subnotebooks will go away," said Kimball Brown, an analyst at Dataquest, Inc. in San Jose, Calif.

This is surprising because generally users were unhappy lightweight subnotebooks in 1994.

Brown said the 1994 variety of subnotebooks suffered from crippled feature sets, including smallish screens, subpar battery life and less-than-full-size keyboards. Recently announced sub-4 pound products such as Hewlett-Packard Co.'s OmniBook 630 and Digital Equipment Corp.'s HighNote Ultra should change that, he said.

"Once you get to an acceptable feature set, everyone wants a lighter notebook," Brown said.

Users say they mostly want more features, and CD-ROM drives were high on the list.

"When you get a notebook with multimedia, the one thing you miss is a CD integrated into it," said Tom Balzarini, PC coordinator at Associated Grocers, Inc. in Seattle. Balzarini said integrated CD-ROM would be helpful for presentations and training.

New year wishes

In addition, Balzarini's wish list includes easy-to-configure PCMCIA slots, on-motherboard 10Base-T connectors, integrated RJ-11 jacks, PCMCIA cellular modems and bigger keyboards all around.

Michael Radigan, program manager at Xerox Corp. in Rochester, N.Y., said he wants built-in speakers and CD-ROM drives. But it seems user wants are outstripping the hardware depreciation cycles.

"I'm looking at all the money we're spending [on notebooks], and now everybody is asking us for capabilities" that do not exist in today's products, Radigan said.

Users look to install Win 95 this year despite ship delay

By Stuart J. Johnston and Ed Scannell

One thing is a given for users in 1995: Windows will expand its dominance and extend into new areas, even though the ship date for Windows 95 has slipped from June to August.

Last week, Microsoft Corp. announced the two-month delay to give it more time to "vigorously" test the software.

When it finally does ship, Windows 95, the next version of Windows, will merge DOS with Windows, eliminating the need for a separate copy of DOS and making Windows a true operating system.

Attribute anticipation

Users are eagerly awaiting features such as 32-bit multitasking, multithreaded execution, longer file names and a new user interface designed to be simpler and more intuitive to use.

Windows 95 is currently in its second beta and has been sent to 48,000 testers, according to Brad Chase, general manager of the company's Personal Operating Systems Group.

Beta testers report that the second beta feels remarkably stable and said they expect to move to Windows 95 fairly quickly. "I think it is going to be a pretty busy year for corporate IS managers with Win 95," said Bill Cornfield, president of the Windows User Support Group in New York. "We expect many of our Fortune 1,000 kinds of users to make a rapid transition over three to six months after its release as third-party applications appear," he said.

There is a silver lining to all this hard work. "One of the big winners should be corporate IS guys who, despite any complaints they might have about [Windows 95], should get bigger budgets to manage the transition over the next two years. It gives them a better lock on their jobs," said Jeffrey Tarter, editor of "The Soft Letter" in Watertown, Mass.

IBM rolls out the OS/2 punches

Users wonder how it will fare against Microsoft's Windows 95

By Ed Scannell

■ It has always been a matter of control in the desktop operating systems wars. Microsoft Corp. has always had it, and IBM has always wanted it.

With delivery of the long-overdue 4M-byte version of OS/2 in November, IBM officials said they believed they had gained back some measure of control from Microsoft. The product performed reasonably well on most typical corporate desktop machines and represented the cornerstone for several versions of products due in 1995.

But as the year closed, Microsoft delivered a features-complete beta version of Windows 95, the next version of Windows, and many corporate users appeared reasonably impressed with it. With industry analysts predicting Microsoft will sell anywhere from 20 million to 40 million copies in 12 months beginning mid-1995, many users said IBM's desktop control goals will remain elusive.

Stiff competition

"IBM's success in 1995 really depends more on what Microsoft does [with Windows 95] than anything IBM can do. To my mind, IBM is no longer in control of its fate," said Bob Evans, a senior technical consultant at Nevada Power Co. in Reno, Nev.

"Maybe the best thing OS/2 will end up doing next year is forcing Microsoft to produce a better Windows 95 and to lower the price of it to OEMs and users. That would benefit the entire industry. But IBM can't afford to be a philanthropist these days," said Dave Landis, a PC coordinator at Consolidated Edison Co. in New York.

If OS/2 fails to take over the desktop, it will not be for a lack of trying on IBM's part. The company is scheduled to release at least four different versions of OS/2 in the first half of 1995 alone — including the Full Pack version of OS/2 Warp, the LAN Client, OS/2 for the PowerPC and OS/2 Server.

An OS/2 version that includes several of the more advanced features borrowed from Taligent, Inc.'s object-oriented operating system may also make an appearance in the first half of 1995. But that may depend on whether Taligent continues to make reasonable progress.

A fighting chance

But despite users' lack of optimism about IBM's chances against Microsoft, most still said that IBM has a good desktop and client/server strategy if all the promised pieces are delivered on time.

"I like what I see coming, with Warp on the desktop and the OS/2/LAN Server [4.0] combination. It looks like a solid client/server strategy at the departmental level," said Don Strock, a LAN administrator at Dow-Corning, Inc.

"Personally, I am impressed with how hard IBM is trying to make its strategy work for 1995. If they had done this a few years ago, they would have [had] a much better chance. But it is really hard for me now to see that this will take," said Paul Grayson, chairman of Micrografx, Inc., a company that has delivered both Windows and OS/2 applications.

If it is ever to vault OS/2 out of its niche status, IBM must sign many more bundling deals such as the ones it signed with Vobis Microcomputer AG and Escom, Germany's largest PC suppliers.

But to land those two deals, IBM gave the two companies overly generous licensing terms to bundle OS/2 on their systems and will make almost no profit, according to sources familiar with the deal. While such deals could result in IBM selling as many as 5 million copies of OS/2 in 1995, financially the company would only break even at best.

Plans call for the third beta test to be complete in June. From the time the code goes "gold" — that is, is signed off as finished — it will take roughly 45 days to manufacture several million copies and ship them to outlets, and for PC manufacturers to install Windows 95 on new machines and ship those to the distribution channel, said Microsoft Chairman and Chief Executive Officer Bill Gates.

Making the big time

Microsoft's projection of how many units of Windows 95 it will sell in the first 12 months after its release has varied from 50 million in December 1993 to 30 million in mid-1994. Analysts predict Windows 95 will quickly become the best selling operating system in history.

On the desktop, that leaves little room for IBM's competing OS/2 Warp to gain much headway (see story above). This is especially true given Windows NT's progress in areas such as workstations and servers.

After a slow first year, when Microsoft sold only about a half-million Windows NT copies, sales took off with the release of NT Version 3.5 in October 1994.

Interest in Windows NT has, in part, been sparked by a family of server products that Microsoft has begun offering on NT Server, including SQL Server, Mail Server, SNA Server and the Systems Management Server. A radical update of Mail Server, called the Microsoft Exchange Server, is due in 1995.

Microsoft has also gone out of its way to convince third-party Unix software houses to port their products to NT.

During 1995, Microsoft will target IBM AS/400 minicomputer users with a new version of SQL Server, called SQL Server 95, said Roger Heinen, senior vice president of Microsoft's Developer Division.

But do not look for the next major update of NT in 1995. That update, code-named Cairo, has been postponed until 1996, said Jim Allchin, senior vice president of the Business Systems Division. Cairo will provide a new object-oriented file system, network support for the company's Object Linking and Embedding technology and a superset of Windows 95's new user interface.

Because Cairo has been delayed, the company is mulling over whether there is a way to ship a new Windows 95-compatible interface for NT. But Allchin said that is unlikely.

Windows 95: Countdown to a desktop explosion

- **March 1993:** Microsoft announces that its next Windows version, originally code-named Chicago, will not need DOS.
- **August 1993:** First alpha code of Chicago goes to testers and developers.
- **June 1994-July 1994:** First beta, "M6," goes to early beta testers.
- **September 1994:** Microsoft renames Chicago as Windows 95.
- **October 1994-November 1994:** Second beta, "M7," goes to 48,000 testers.
- **December 1994:** Microsoft announces it may push Windows 95 ship date from June to August.
- **March 1995:** Third beta, "M8," the Preview Program, will go to as many as 400,000 testers.
- **May 1995-June 1995:** Beta test will end, and final code will go to manufacturing.
- **August 1995:** Windows 95 scheduled for release.

Microsoft Windows 95

Microsoft acknowledged it would need another couple of months to properly test the operating system to ensure it more smoothly installs and configures with a wider range of hardware and software. Company officials claimed the additional time would not be spent repairing major bugs or adding any new features.

New Products

Spalding Software, Inc. has announced DataImport 4.0 for Windows, data translation software.

According to the Norcross, Ga., company, DataImport 4.0 lets users access data from PC, midrange and mainframe applications, regardless of file format.

The product translates data into native formats of popular PC spreadsheet and database applications. Features include the capability to unstack multiline detail items on screen and extract specific sections of a report.

DataImport 4.0 costs $189.

▶ *Spalding Software*
(404) 449-1634

Tektronix, Inc. has announced the Phaser 540, a color laser printer.

According to the Wilsonville, Ore., company, the Phaser 540 produces continuous-tone color for photographic-quality images and print-on-demand speeds.

The printer prints four full-color pages per minute and 14 monochrome pages per minute. Automatic port and protocol switching lets Macintoshes, PCs and Unix workstations use the Phaser 540.

The Phaser 540 costs $8,995.

▶ *Tektronix*
(503) 682-7377

Canon Computer Systems, Inc. has announced the IX-3010, a gray scale, flatbed scanner.

According to the Costa Mesa, Calif., company, the IX-3010 provides 300 by 1,200 dot/in. resolution and can capture an image in 10 seconds.

The product includes Caere Corp.'s Omniscan Plus scanning software and PageKeeper Portfolio software, which manages paper and electronic files.

Users can scan documents and convert them into text that can be edited from within their favorite word processor, spreadsheet and desktop publishing applications.

The IX-3010 costs $569.

▶ *Canon Computer Systems*
(714) 438-3000

IN 10 DAYS, DELL CAN INS
SYSTEMS ALL OVER THE
OF COURSE, YOU COULD



The Intel Inside logo is a registered trademark of Intel Corporation. Look for the symbol on our quality computer systems. ΔIf you encounter a compatibility problem within 3 years after the original purchase, we guarantee that Dell's engineers and technicians will work with you to identify the cause and recommend a solution. For a complete copy of our limited compatibility guarantee, contact Dell at 1-800-933-4177. Guarantee applies to PC hardware only and does not extend to software or devices not intended to run on comparable ISA or EISA systems of the same vintage. "Asset Recovery services provided by Aurora Electronics, Inc. Dell disclaims proprietary interest in the marks and names of others. ©1994 Dell Computer Corporation. All rights reserved.

TALL 1000 CUSTOMIZED COUNTRY FOR YOU. ALSO DO IT YOURSELF.

Managing a large-volume project takes a miracle.

A miracle you may soon have to perform if you choose to upgrade your standards for Chicago.

Or if a new automation initiative means you have to magically equip your company's entire sales force with portables overnight.

You'll then have two options, not counting celestial intervention:

Either you can take it upon yourself to meticulously customize the configurations. Then distribute them across the country. And then spend more time installing them.

Or you can call Dell, then sit



back and relax. Because we'll do everything it takes to pull off even your biggest projects.

It's just one of the areas in which we've lowered the costs and hassles associated with all three stages of a computer's life-cycle: to the desk, on the desk and off the desk.

WE CAN CUSTOM-BUILD AND INSTALL 1000 CONFIGURATIONS AT 100 LOCATIONS IN 10 DAYS.

No smoke and mirrors, really. We start by creating a pilot program where we assess every configuration and location in meticulous detail. (To make sure your roll-out goes smoothly, even before it happens.)

Then we custom-build each PC to your specifications. No matter how many configurations you need.

HOW DELL LOWERS YOUR COSTS AND HASSLES WHILE PREPPING YOUR SYSTEMS.

We can pre-load your software, even proprietary software written specially for your company.

We can load your peripherals, even customized ones like special keys and brackets.

Another trick: we can tag your PCs with your own asset tags.

By the way, all of our PCs are built to ISO 9002 quality standards, then covered by Dell's exclusive compatibility guarantee.[Δ]

HOW DELL LOWERS YOUR COSTS AND HASSLES WHILE INSTALLING YOUR SYSTEMS.

Unlike most big PC vendors, Dell will build, store and ship all your systems from one location: our facilities in Austin, Texas.

So you won't end up wasting time or paying storage and management fees to a middleman.

As each new PC arrives at its location, a Dell representative can be right there to install it.

Before disconnecting your old PC, we can transfer its files. So you won't be expected to conjure up a lost file for an irate user later.

You won't be expected to get rid of the old PC either. We can do everything from cleaning off its hard drive and removing its asset tag to physically hauling it away.

And with our EPA-compliant computer disposal process,* that dead PC won't come back to haunt you in the form of a costly fine.

BUT DON'T TAKE OUR WORD FOR IT, TAKE IT IN WRITING.

Give us a call and we'll send you a project bid to prove how much Dell can do for your company.

And the next time you need to pull off an impossible project, remember one thing:

We'll perform the magic. But you'll get the applause.

DELL®

(800) 247-2104

MONDAY-FRIDAY 7AM-9PM CT • SATURDAY 10AM-6PM CT • SUNDAY 12PM-5PM CT
KEYCODE #12009 • CANADA CALL 800-387-5755 • MEXICO CITY CALL 800-228-7811

More strong PC growth expected for 1995

By Jaikumar Vijayan

Buoyed by strong demand for desktop multimedia systems and notebook computers and by rapidly improving price/performance, the U.S. PC market continues to surge. PC unit shipments topped 20% growth for a third year, according to figures from International Data Corp. (IDC) in Framingham, Mass.

The same factors are expected to result in a strong performance for 1995, with expected market growth of 15% to 20%, IDC predicted.

"The PC market has been turned on its head, with the consumer market leading the way," said Richard Zwetchkenbaum, an analyst at IDC.

As a result of this growth, there has been a greater vendor focus on ergonomics, ease of installation, serviceability and the integration of CD-ROMs in more business systems, according to Zwetchkenbaum.

According to the report, strong growth in the PC market is also due to the following:

- More retailers stocking computers.
- Wider consumer acceptance of the PC.
- The rapid pace at which older-model PCs are being replaced.
- A cessation of the consolidation among the bottom tier of vendors that was rampant in 1993.

IDC predicts that PC shipments will hit 18.4 million by the close of 1994. That figure is up 23%, from 14.95 million in 1993. The IDC data is based on three quarters of actual results and a forecast for the fourth quarter of 1994.

Compaq cruises

Market leader Compaq is projected to ship an estimated 2.36 million units in 1994, followed by Apple with 2.22 million and Packard Bell with 2 million. IBM trails in fourth place with 1.87 million. Rounding out the Top 10 vendors in terms of unit shipments in the U.S. market are Gateway 2000, Inc., Dell Computer Corp., AST Research, Inc., Toshiba, HP and AT&T GIS.

And the winner is...

Closing out the year, Compaq Computer Corp. will top the PC market with a projected 12.8% market share, followed by Apple Computer, Inc. at 12.2% and Packard Bell Electronics, Inc. with a 10.8% share. Former market leader IBM will finish fourth with a 10.2% share.

Aceording to the report, 1994 seems to have been a particularly good year for companies such as Hewlett-Packard Co., Toshiba America Information Systems, Inc., Packard Bell, Acer America, Inc. and AT&T Global Information Solutions, all of which had growth rates in excess of 85% in the past year.

Packard Bell and Acer seem to have benefited primarily from the retail boom in multimedia systems, the report said. Product revamps and a general broadening of their offerings may have helped HP and AT&T GIS have a good year, too, while Toshiba has staged an impressive comeback in the notebook market, where it wrested the No. 1 slot from Compaq, according to IDC.

Brief

SunSoft adds to SolarNet

SunSoft, Inc. said last week it is adding PC-X Window System software to its SolarNet PC administration software for Unix servers. This will allow PC users to access those Unix servers through a point-and-click interface. Pricing starts at $345 per user.

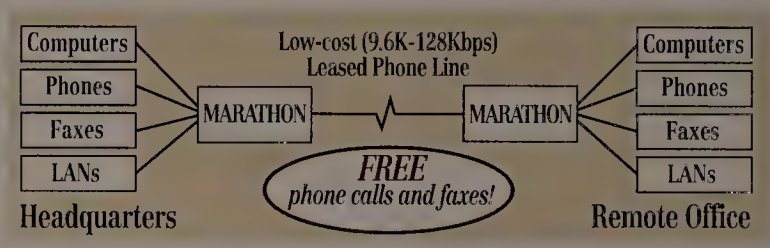


"Marathon buys one of these every month"

"We were skeptical about the savings. Even after we saw a live demonstration, we didn't think Marathon could save our classic Corvette dealership all that much money. But we figured we'd save at least enough to pay for the equipment and then keep some savings each month. So we installed a MICOM Marathon Data/ Voice Network Server in our Saugus Massachusetts showroom and another in our new Pompano Beach, Florida facility.

Marathon let us route incoming calls between our locations for free.

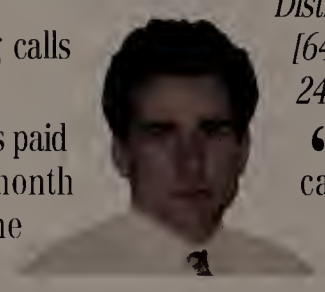
In just the first month, the savings paid for both Marathons. And every month since, Marathon has saved us the equivalent of a '58 Vette.



I'm Tony Visone of Visone Motors. I sell investments you can use and enjoy. And while a Marathon can't give you the same thrill as a vintage Corvette in your garage, it's an investment that can bring a smile to your face every month.

Whether you have two or 250 locations, Marathon delivers all communications on one line. Ask for a free brochure today.

Call toll-free for the certified Marathon Distributor in your area (800) MICOM AD [642-6623] ext. 1034 or (805) 583-8600. 24-hour fax (805) 583-1997.



"The sooner you call, the sooner you can start investing in something you really want, instead of phone company toll charges.

MICOM®

Products that pay for themselves.™

Trademarks are property of their respective owners



Workflow, imaging go mainstream, 78

NetWare, NT Server to divide lion's share

By Laura DiDio

■ The network operating system arena looks like a two-horse race in 1995, with Novell, Inc.'s NetWare 4.1 and Microsoft Corp.'s Windows NT Server 3.5 locked in a battle for first place in new installations.

IBM's LAN Server 4.0, which has quietly garnered new account victories among IBM's installed base of mainframe shops, will put in a strong third-place showing, good for about 10% market share, according to industry analysts.

The rest of the field — including Banyan Systems, Inc.'s Vines and the all-but-dead Hewlett-Packard Co. LAN Manager — will be strictly relegated to also-ran status in the year ahead, analysts said.

The current champion, NetWare, with an installed base of 3 million users and close to 70% market share, is many lengths ahead — for now. But challenger NT Server 3.5 has lots of marketing momentum. Users and analysts say they expect it to make up ground quickly at NetWare 4.1's expense.

"Novell has to jump-start its NetWare 4.1 revenue starting in the first calendar quarter," said Steve Schatt, an analyst at Computer Intelligence InfoCorp in La Jolla, Calif.

Hard to resist

Historically, end users have been reluctant to switch horses in midstream. But that may not be the case with NT Server 3.5. While there is hardly a stampede, after several months of beta-testing the operating system, a few users said they will phase out NetWare in favor of NT Server in the coming months.

One such user is Randy Dugger, associate information systems director at Liposome Technology, Inc., a pharmaceutical company in Menlo Park, Calif.

"NT Server 3.5 doesn't come with a red Ferrari, but other than that it's been great and has all the features and functionality I want," Dugger said. "It's proved so stable in our production networks over the past four months that we've decided to phase out NetWare."

Steve Sommer, director of MIS at New York law firm Hughes Hubbard & Reed, said Microsoft is marketing NT Server harder and doing more to win his business than Novell is.

"Microsoft has let me give them more input on features and functionality for NT Server 3.5 than Novell did with NetWare 4.1," Sommer said. "Novell hasn't done anything to fight to keep my business. I'm switching to NT Server 3.5."

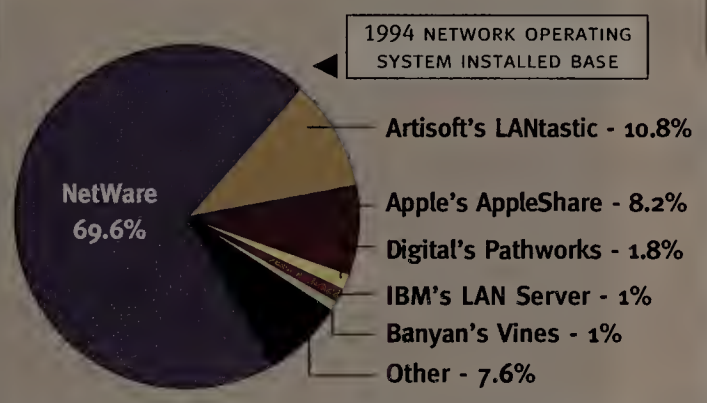
Even stalwart NetWare devotees, such as Ed Wilk, network manager at WHDH-TV in Boston, aeknowledge being both worried and influeneed by the ubiquitous Microsoft marketing juggernaut.

"I'm not fully convineed of the merits of NT Server, but I can't ignore it," Wilk said. "Mierosoft's influence is so pervasive, it's scary. The company wants to sell me everything from keyboards to checking account software."

Clearly, no one expects the installed base of NetWare users to ride off into the sunset and into NT Server's waiting arms, said Bob Sakakeeny, an analyst at Aberdeen Group in Boston. "But Novell has angered its customer base by lagging behind on delivering NetWare 4.1. When a company does that, there's backlash," Sakakeeny said.

NetWare everywhere

Although it does not yet have a presence in this market, NT Server 3.5 is expected to challenge NetWare



Figures are based on interviews with 582,690 U.S. establishments

Source: Computer Intelligence InfoCorp, La Jolla, Calif.

Pentium clones line up

Intel looks to sixth generation, but P6-based systems unlikely before '96

By Jaikumar Vijayan

1995 could well be the year of the fifth-generation x86 microprocessor.

As Intel Corp. intensifies its efforts to move the market to Pentium and as rivals such as Advanced Micro Devices, Inc. and Cyrix Corp. begin volume production of Pentium-class products by mid- to late 1995, market attention will become firmly focused on 586-elass chips, analysts said.

NexGen, Inc., the other Pentium-clone manufacturer, is already shipping chips in volume, and low-cost systems based on its processors should become widely available next year.

Still, 486-based systems should account for approximately 50% of the market in 1995, with Cyrix and AMD picking up where Intel leaves off, said Jennifer Munson, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H.

"The 486 is a very useful ehip for a lot of corporate applications. It's going to be around for a few more years," she said.

Intel hopes to pull away from the pack by announcing its sixth-generation P6 proeessor. The chip is rumored to have patented teehnology that will make it difficult for other vendors to clone. But systems based on the processor are not expected to hit the market until well into 1996 and are unlikely to have mueh market impact on other processors for at least another eouple of years, analysts said.

At the same time, "Intel will start losing some market share next year" as eustomers look at emerging high-performance chip alternatives, Munson said.

For instance, desktop boxes based on PowerPC ehips should become available from IBM in mid-1995. The long-awaited PowerPC 615 chip, which will run DOS and Windows applications in emulation, should also be available by then and eould spur demand for PowerPC platforms among current Intel users, aecording to analysts. Meanwhile, higher-speed chips such as the 133-MHz PowerPC 620 should start shipping by mid-1995.

Other RISC ehip makers will also begin to make available a wide variety of ehip alternatives aimed mainly at the server and multiprocessing markets.

Digital Equipment Corp.'s Alpha AXP 21164, whieh boasts three times the integer performance and six times the floating-point performance of Intel's 100-MHz processor, will be aimed at the database, departmental and workgroup server markets.

Mips Technologies, Inc.'s Windows NT-optimized R4400 and R1000 processors will target those markets as well.

Vendor/chip	Availability	Clock speed	Features	Description
Intel/P6	Third-quarter 1995	250 to 300 MHz	6 million transistors, 256K-byte L2 cache	Will hold more transistors than current Pentium processors. Aimed at high-end PC and multiprocessing applications.
IBM/Motorola/ PowerPC 620	Mid-1995	133 MHz	64-bit superscalar RISC	Aimed mainly at the high-end symmetrical multiprocessing environment.
AMD/K5	Volume shipments in mid-1995	Matches current Pentium processors	0.5 micron, 4 million transistors, superscalar RISC	30% higher sustained performance than Pentium running at equivalent clock speeds.
Digital/ Alpha AXP 21164	Volume shipments in January for 266-MHz version and March for 300-MHz version	266 and 300 MHz	0.5 micron, 64-bit CMOS RISC	The fastest processor available, with performance in excess of 1 billion instructions per second.
Cyrix/M1	Sampling now; volume shipments in first-quarter 1995	50 MHz and faster	0.5 micron, 586 RISC-class	Manufactured by IBM. Matches current Pentium performance.
Mips Technologies/ VR10000	Volume shipments in second half of 1995	300 MHz	0.35 micron, 2 million transistors, 64-bit RISC	Aimed largely at database and application servers.
NexGen/ Nx586	Shipping now	The equivalent of 75-, 90- and 100-MHz Pentium chips	0.5 micron, 64-bit buses	First Pentium-class clone to ship. More than 50 vendors have signed up with NexGen.

Workflow, imaging go mainstream

By Mary Brandel

The workflow market is expected to explode this year as new entrants — including operating system vendors — jockey for position.

Meanwhile, imaging will usher out smaller players as it settles more comfortably into existing, rather than specialized, business environments.

Much of the workflow growth will come from users adding to their current imaging systems. This means repeat business for the likes of IBM, FileNet Corp. and Wang Laboratories, Inc., said Jennifer Mitchell, an analyst at Dataquest, Inc. in San Jose, Calif.

But many other players will also seek the mantle of workflow vendor. "At some point, this category of product may turn out to be a general productivity tool for white-collar workers, like the word processor," Mitchell said, and everybody wants a piece of the pie.

Users need to make sure they purchase applications that are compatible with the document-management plans of Apple Computer, Inc., Microsoft Corp., IBM and Novell, Inc.

Workflow systems will become more appealing due to their ability to work with database records, electronic-mail messages and text documents, said Carl Frappaolo, executive vice president at Delphi Group, a consultancy in Boston. Also, "users have been screaming for simulation and modeling tools," he said. Vendors will start to respond in 1995.

The soft side of imaging

While vendors of imaging, workflow and document systems are gaining revenue . . .

Systems vendors	
1994	$979M
1995	$1.08B
Average compound annual growth rate:	12%

. . . integrators of these systems are doing even better

Integrators	
1994	$1.89B
1995	$2.45B
Average compound annual growth rate:	23%

All figures projected

Source: Dataquest, Inc., San Jose, Calif.

Altered image

Imaging will continue to wend its way into existing business applications and environments. In fact, images "are becoming less a technology [and] more a data type," Frappaolo said. "It will become an expected feature in databases and text systems."

In addition, both workflow and imaging systems will continue to link up with popular development environments such as Powersoft Corp.'s PowerBuilder and Microsoft's Visual Basic. Wang is currently leading this effort.

"That's the key to why we're implementing imaging into our current applications rather than buying a complete turnkey system from a VAR," said Kelly Fansler, senior programmer/analyst at Watkins Motor Lines, Inc. in Lakeland, Fla. "You can tie in images directly with the data."

"The predominant approach today is proprietary," Frappaolo said. But more people are asking, "Why can't we just use what's out there?" he said.

Two late 1994 events will bear out that trend: The opening of Lotus Development Corp.'s LN:DI to imaging servers from Wang, FileNet and ViewStar Corp. and built-in imaging services in Novell's NetWare 4.1.

Low prices on desktop imaging systems may also help ease the technology into corporations. But "cost is still the highest barrier when evaluating systems," said Bob Larrivee, an analyst at BIS Strategie Decisions in Norwell, Mass.

Costs exist mainly in services (see chart). Integrators, Mitchell said, are seeing 100% growth in imaging contracts signed. Specialized hardware, such as production-capable scanners and optical jukeboxes for hundreds of gigabytes of data, also adds to the price, she said.



A smart way to spe

User preference pushes Unix, Windows closer together

Need for diversity fuels connectivity at both ends

By Jean S. Bozman

The open systems world is drifting toward greater connectivity among Unix servers and Microsoft Corp. Windows clients and Windows NT servers. The pull is coming from users who already have hundreds or thousands of Windows PCs surrounding a relative handful of Unix servers.

Meanwhile, sales of Unix systems remain strong, growing fastest on the high-end platforms that run corporate databases, industry analysts said.

The Alberta Cancer Board typifies this trend. Felix Fridman, director of information systems, is starting a LAN at corporate headquarters based on Microsoft's Windows NT servers and Windows for Workgroups groupware. But Fridman's 500-user organization runs all its mission-critical applications on 15 Sun Microsystems, Inc. servers and about 80 Sun workstations.

"We're hoping for more Windows connectivity," said Fridman, who relies on a TCP/IP network and Sun's PC-NFS software to tie Windows clients to Unix servers. "We feel comfortable with diversity on the client side."

Fridman is also interested in Sun's planned release next year of the OpenStep object-oriented application development framework and in setting up some Next Computer, Inc. NextStep or OpenStep clients on the desktop.

Year of choice

Industry analysts at International Data Corp. (IDC) predict the overall workstation market will see 30% growth in 1995, including Windows NT machines. Unix workstations on their own will grow by roughly 15%, said Laura Segervall, manager of workstation research at IDC in Mountain View, Calif. In 1994, about 895,000 workstations were sold worldwide, she said.

Analysts also expect considerable crossover between high-end PCs, led by those based on Intel Corp.'s Pentium, and low-end Unix workstations from IBM, Hewlett-Packard Co. and Sun.

"I think we could probably lay the distinction to rest by the end of the year," said Michael Goulde, a senior consultant at Patricia Seybold Group in Boston. "In 1995, you'll have your choice of multiprocessor Intel desktops and RISC desktops, with the same operating systems on many different platforms."

Many players

High-end Unix servers, the fastest-growing segment of the Unix market, include IBM's SP/2; Digital's Advantage clusters; Cray Research, Inc.'s T3Ds based on Digital's Alpha chips and Superserver CS 6400s based on Sun's SPARC chips; and Convex, Inc.'s Exemplar servers based on HP PA-RISC chips.

This will allow users to pick and choose applications without having to swap out hardware to accommodate them. Sun workstations, for example, run the Solaris operating system on Intel chips; a Solaris version to run on PowerPC will be ready next year. Similarly, Windows NT runs on PowerPC and Digital Equipment Corp.'s Alpha chips. Some believe Intel's Pentium problems may boost unit sales of RISC-based PCs.

Unix server growth will continue to be very strong in the midrange and high-end segments of the market, according to longtime Unix-watcher Terry Bennett, an independent analyst in Beaverton, Ore. Already strong as corporate database servers, Unix symmetrical multiprocessing servers will become more powerful with the advent of 64-bit chips and 64-bit operating systems in 1995.

"It's one of the fastest-growing segments in the computer industry — about 30%," Bennett said.



It's also a smart way to maximize the PC networking capabilities of OS/2® or DOS with Windows.™ In fact IBM® TCP/IP workstation software is a perfect building block for linking users running on virtually all IBM environments including AIX,® OS/400,® VM and MVS, as well as non-IBM systems.

IBM TCP/IP for OS/2 or DOS/Windows

With IBM TCP/IP for OS/2 or DOS/Windows you not only get industry-standard network software, you also get a feature-rich package. File transfer, terminal emulation, mail, network printing, remote command execution and network management are just some of the applications included. Optional features include NFS,® Netbios, X-Windows (OS/2) and application development toolkits.

Of course one of the most attractive features of IBM TCP/IP solutions is the kind of support and service that only IBM offers. To order or for more information, call 1 800 IBM-CALL, Dept. SAO21.

IBM TCP/IP. When it comes to making it all work together, we know our ABCs.

IBM, OS/2, AIX and OS/400 are registered trademarks of International Business Machines Corporation. NFS is a registered trademark of Sun Microsystems, Inc. Windows is a trademark of Microsoft Corporation. Dealer prices may vary. © 1994 IBM Corp. All rights reserved.

IBM

ll interoperability.

DEADLINE APPROACHING JANUARY 23, 1995

mother ALWAYS KNEW YOU WERE A GENIUS



PROVE HER RIGHT. Call 1-800-829-4143 now for your free Windows World Open Entry Kit.

Blow the judges away with your Microsoft® Windows™ custom application. Display your ingenuity for creating an application that's streamlining the way your corporation or organization does business. Get showered with recognition from your peers. Participate in an awards ceremony featuring Bill Gates and other industry luminaries. Then call home and tell mom thanks for keeping the faith. Find out more by calling for your free Entry Kit today.

But hurry, the entry deadline is January 23, 1995.

WINDOWS WORLD OPEN
COMPUTERWORLD'S CUSTOM APPLICATION CONTEST

COMPUTERWORLD · Microsoft · THE INTERFACE GROUP

COGNOS · WALL DATA · FORTUNE · healthcare INFORMATICS · REAL ESTATE TODAY / REALTOR NEWS

Windows World Open is held at WINDOWS WORLD in Atlanta, April 24-27, 1995.

The Windows World Open Entry Kit contains all details and rules for this contest. Contest is void where prohibited by law. No purchase necessary. Computerworld, Inc. is an IDG Company. Windows, Windows World and the Windows logo are trademarks of Microsoft Corporation. Windows World and the Windows logo are used by INTERFACE GROUP - NEVADA, Inc. under license from Microsoft. All other trademarks are the property of their respective owners.



WIRELESS. NETWORKING FORECASTS FOR 1995, 82

Client/server messaging: Don't hold your breath

By Suruchi Mohan

For most users, 1995 will be the year for watching and waiting for client/server messaging products to surface. The move to these products will not occur until 1996, most industry pundits agreed.

For their part, vendors, including Lotus Development Corp., Microsoft Corp. and Novell, Inc., are planning to introduce their client/server messaging products in 1995, although some products may slip into 1996. Meanwhile, most users are staying put.

"We will see a lot of confusion from customers who don't understand client/server [messaging] or how to migrate," said David Marshak, vice president and senior consultant at the Patricia Seybold Group in Boston. "But we won't see any actual movement until 1996."

Judy Rosall, program manager at International Data Corp. in Mountain View, Calif., agreed. "Is 1995 the year? I don't think so," she said. The movement to client/server messaging will not happen until 1996, she predicted.

Shakeout scenario

In other ways, 1995 will be the transition year that will see a shakeout in the industry, perhaps leading to a more stable 1996. Sara Radicati, president of The Radicati Group in Palo Alto, Calif., said she expects to see "a lot more mergers and acquisitions." In 1994, small companies were buying small companies; in 1995, big companies will buy big companies, she predicted.

Further, she added, the messaging scenario in 1995 will be completely different from that of 1994 — the players will be different. "We'll have new top players [who] we don't [even] think about today," Radicati said.

Some of these new players may be in areas that are only now gaining ground, such as X.500 directory services and electronic-mail management, according to analysts.

Lotus' announcement in December of its implementation plans for X.500 may set the ball rolling toward widespread adoption of directory services. However, given the lag time between when products become available and their implementation, there may not be much movement before 1996. Indeed, Marshak said he thinks the X.500 market may not be in much better shape, but "[we] may know better where we are going."

Messaging management has been an issue for some time, and 1995 may see more new products on the market. According to Rosall, management will be one of the core pieces for people's selection of a messaging system.

Connection lost?

Overall, Marshak said, by the end of 1995 users will achieve virtually ubiquitous connectivity. This will lead to frustration, too, because of the quality of the connectivity.

For example, users will wonder if all kinds of file attachments will work over all kinds of connections. Also, connectivity will bring in its wake viruses and security breaches — and as a result, some backlash against wide-open use of mail. This may lead companies to put restrictions on external mail sources.

If this happens, this will be a second instance of a move toward conservatism. Just recently, plug-and-play messaging components from different vendors were all the craze. This led to the move, once again, toward going for a solution from one vendor — reminiscent of the days of the mainframe. Messaging connectivity may indeed come full circle in 1995.

E MAIL

Mail mania

According to a survey of 2,000 large companies by the Electronic Messaging Association in Arlington, Va., there were 180,000 E-mail sites in 1993. The survey forecasted that the number of E-mail sites would increase to 250,000 from 1994 to 1995. The number of E-mail users worldwide in 1994 is between 40 million and 50 million, and it could reach 60 million by the end of 1995, the association said.

Experts probe threats, defenses to 'net security

By Gary H. Anthes

An etectronic pott of security experts on the Internet brought these replies. (Answers edited for length; participants listed betow.)

CW: What new or increased security threats might we see in 1995?

Michael Paris: Virus writers are running beta copies of Microsoft's Windows 95 so they can be ready to cause trouble for the new users. Virus writing has been slow this year, but those I talk to have said most of their time is being spent learning and practicing for Windows 95.

Donn Parker: Theft of small computers will reach epidemic proportions requiring jewelry security methods. Also look for automated hacking, where entire crimes, including conversion to gain, will be automated. This will require automated detection, mitigation and retaliation to deal with electronic speeds of these crimes.

There will be LANarchy, where knowledge of equipment and interconnectivity in large organizations is lost. You can't make something secure unless you know you have it.

There will also be information anarchy because those who encrypt information in an organization may not be those who have accountability for it. You need control over key and device management by higher management.

William Murray: Special [hacking] knowledge is getting encapsulated into computer programs. All you have to do to get a [password sniffer] is broadcast onto the Internet and you get an answer back. Hackers aren't getting any smarter; their work is just getting easier and easier.

John Linn: Given the growing availability of resources sold across on-line services and on the Internet, I'd expect to see growth of impersonation attacks [such as credit-card fraud].

B. Clifford Neuman: We are likely to see much greater incidence of network monitoring attacks, where attackers listen to the network looking for passwords and other important data. Payment services are starting to appear on the network, and attacks on weaker systems will be lucrative.

J. E. O'Neil: "Social engineers" will perform cons in order to get log-in/passwords, credit-card information, calling-card information and other personal information from unsuspecting victims.

Under the auspices of competitive advantage, companies will increase their espionage activities. Foreign governments will continue to infiltrate U.S. business in order to reduce their research and development expense.



TOM ZIMBEROFF

SRI International's Donn Parker *predicts that small-computer theft will reach 'epidemic proportions' in 1995*

Ken Cutler: The dramatic growth in Internet usage means more people will come under attack. If the [company] downsizing trend continues, that will continue to create concerns about disgruntled employees.

CW: What new defense measures are we likely to see in 1995?

O'Neil: There will be an increase in the use of token-based authentication for dial-in access to organizational systems. These tokens will make it more difficult for unauthorized users, both hackers and insiders, to access systems they should not be accessing. Encryption use will greatly increase.

Security, *page 82*

Information security experts polled by Computerworld

Ken Cutler, vice president and director, Information Security Institute, a division of MIS Training Institute, Woodbridge, Va.
Dorothy Denning, computer science professor, Georgetown University, Washington
John Linn, principal architect, OpenVision Technologies, Inc., Cambridge, Mass.
William Murray, information security consultant to Deloitte & Touche
B. Clifford Neuman, assistant professor, University of Southern California, Information Sciences Institute, Marina del Rey, Calif.
J. E. O'Neil, information security manager, Pacific Bell
Michael Paris, president, Computer Research & Information Service, Cicero, Ill.
Donn Parker, senior consultant for information security at SRI International, Menlo Park, Calif.

Time to sort out network options

By Stephen P. Klett Jr.

For vendors and users alike, 1994 was a turbulent year for internetworking. While 1995 should bring no new technology, keep those seat belts fastened because the bumpy ride will continue.

During the past year, users have been buffeted with a plethora of Ethernet, Token Ring and Asynchronous Transfer Mode (ATM) switching products covering workgroup and enterprise applications.

While these products should provide relief to bandwidth-strapped networks, they are also creating confusion in the short term.

"I'm hoping that some of the [fear, uncertainty and doubt] issues in the high-speed LAN area will resolve themselves," said Kathryn Korostoff, president of Sage Research, Inc. in Natick, Mass. "A lot of people are waiting to see what the Joneses do before they make any decisions."

In the meantime, switching has spurred furious consolidation (see story, page 58). Some of the largest examples include the blockbuster merger of Wellfleet Communications, Inc. and SynOptics Communications, Inc. to form Bay Networks, Inc.; and more recently, Cisco Systems, Inc.'s acquisition of Kalpana, Inc. and LightStream Corp.

Then there is the issue of speed.

Two competing proposals for 100M bit/sec., or "fast," Ethernet — 100Base-T and 100VG AnyLan — are expected to be ratified by the Institute of Electrical and Electronics Engineers, Inc. as standards next month. A bevy of products supporting each technology are slated to appear in the first quarter from companies such as 3Com Corp. and Hewlett-Packard Co.

However, analysts expect products that combine switched legacy LAN technology with high-speed links for servers — such as 3Com's LanPlex 2000 and UB Networks, Inc.'s GeoRim hubs — to be the hot tickets next year.

Many implementations of 25M bit/sec. ATM came on strong toward the end of the year due to broader vendor support and the ATM25 Desktop Alliance. A recent ATM Forum vote in Japan has cleared the way for the technology to be reconsidered as standards, which would result in two competing low-speed ATM standards: 25M and 51M bit/sec.

In addition, a LAN Emulation standard for transporting legacy LAN traffic over ATM is expected to be ratified by the ATM Forum in January, which should make ATM a serious contender for user mind share in the second half of 1995, analysts said.

Plans for ATM

"ATM is obviously something we're watching very closely and is something we want to do," said Jerry Magginnis, director of telecommunications at McCann-Erickson Worldwide in Louisville, Ky. "My vendors better be ready for ATM in '95 because I am, and if they're not, I won't hesitate to change them."

Most vendors are scrambling to heed this call. For example, Bay Networks and Cabletron Systems, Inc. are each expected to roll out LAN and ATM switching products for their respective enterprise hub platforms in the first quarter.

Bay Networks will unveil LAN switching modules for its System 5000 hub followed by an ATM core-switching engine for the 5000 in the seeond quarter. Bay Networks' much ballyhooed and much delayed LattisCell 28000 "fast" Ethernet switching hub is also expected to ship in the first quarter. Chip problems kept the 28000 from meeting its third-quarter 1994 ship date.

Cabletron, meanwhile, will unveil LAN and ATM switching modules based on its Secure Fast Packet Switching technology, whieh it announced last January.

This is good news for some users.

"We've run into some congestion and are starting to look at and evaluate LAN switehing as a possible fix — with ATM cell switching being the light at the end of the tunnel," said Chris Steele, telecommunications specialist at Chrysler Corp. in Center Line, Mich.

Bright future for hubs

Revenue forecast for chassis and stackable hub market (Worldwide U.S. vendor sales)



Source: The Yankee Group, Boston

Be patient with wireless waiting game

Transition could take most of 1995, but most pieces will fall into place

By Michael Fitzgerald

■ After a sobering 1994, those who want wireless data will need to be patient in 1995.

While the wireless market continues to have bright promise, the technology is taking longer to roll out than perhaps anyone expected at the start of 1994.

Equipment delays have plagued deployment of a Cellular Digital Packet Data (CDPD) network, and usability and geographic coverage issues have challenged existing wireless data networks from Ardis Co. and RAM Mobile Data USA L.P.

Further, vendors are just now figuring out that they must sell wireless networks differently than they sell land line networks.

All this means that 1995 will likely be a year of transition for the wireless world.

"The promises made in '94 will appear in '96. You just have to get through '95," said Iain Gillott, an analyst at Link Resources Corp. in Framingham, Mass.

Analysts say they expect to see a number of developments in 1995, including the following:

- A proliferation of wireless modems, which should reduce costs of these pricey peripherals.
- Increased software development, which should make wireless applications easier for corporate users to apply.
- Continued standards development so users do not have to pick and choose between the various wireless data networks.
- Increased network presence, in the form of narrowband personal communications services, which will create sophisticated paging networks that can be used for a variety of limited data purposes.

"It's going to be easier than it's ever been to use wireless in 1995, but it's still not going to be a slam-dunk" technology, said Andrew M. Seybold, editor of the "Outlook on Communications and Computing," a newsletter in Brookdale, Calif. Seybold said corporate users should apply common sense when thinking about wireless applieations in 1995.

"If you can prove that it works for you and it saves you time and effort and money, you should use it," he said.

Seybold compared wireless data with using a modem to transmit files from a hotel room in 1990. "You can do it, but it's not something that's ubiquitous," he said.

CDPD exposure

Users, particularly those waiting for CDPD to develop, should begin to get a taste of what it will do for them.

"The rollout [of CDPD] is somewhat slower than everyone had hoped.... But we intend in some geographic areas to be able to deploy it on a mission-critical basis," said Sheldon Laube, national director of information and technology at Price Waterhouse. Laube said the allure of wireless data "is just like cellular phones. I mean, you don't have to find the phone line" to use it.

Listen ma, no wires!

	Number of wireless voice users	Number of wireless data users
1994	22.6M (20.8M cellular)	22.4M (21.3M paging, 945,000 cellular*)
1995	27.7M (25.8M cellular)	27.2M (25.8M paging, 1.2M cellular*)
1996	32.9M (30.9M cellular)	33.7M (31.6M paging, 1.8M cellular*)

*Includes both circuit-switched and CDPD — All numbers projected

Source: Link Resources Corp., Framingham, Mass.

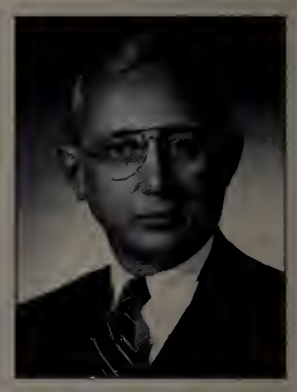
Security

CONTINUED FROM PAGE 81

Linn: We've started to see the availability of technologies for authentication, integrity and confidentiality. In 1995 we will see more applications building them in.

Cutler: We'll see better security interoperability as a result of continuing improvements in OSF/DCE security. There may also be better security features in database packages.

Neuman: We will see greater use of onetime passwords and integration of onetime password mechanisms with cryptographic authentication systems such as Kerberos. We will see widespread use of public key cryptography for privacy of communication to service providers.



Consultant William Murray: *Hackers' work getting easier*

Dorothy Denning: I expect to see continuing developments in firewalls, intrusion detection systems, cryptography — including use of PCMCIA cards both for secrecy and authentication — and antiviral protection. It will also get easier to use onetime passwords and challenge-response protocols. We will also see new approaches to key-escrow encryption, especially commercial key escrow.

Murray: New tools for authentication, confidentiality and integrity are being used. More than half of the Fortune 500 companies use onetime passwords. Unfortunately, the total use of computers in those firms is growing much faster than the application of the onetime passwords.

IBM big iron revamps bode well for '95

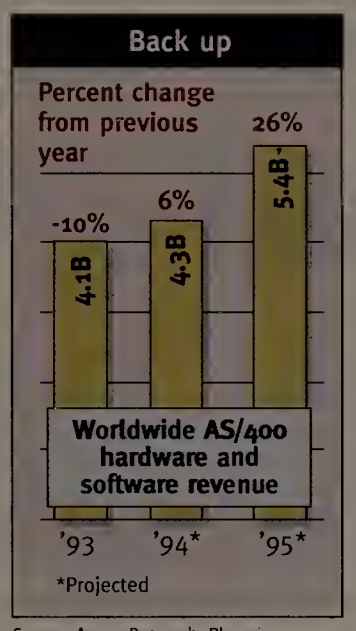
Client/server OS, 64-bit architecture await AS/400

By Craig Stedman

IBM has spent the past few years trying to answer questions about the AS/400's place in a client/server world. In 1995, users will start to find out whether the computer giant got it right.

A client/server-oriented rewrite of the OS/400 operating system is supposed to be fully in place by February, following a three-month delay on some pieces of software [CW, Nov. 28]. The other shoe will drop in the second quarter when the AS/400 is scheduled to make the quantum leap to the 64-bit PowerPC architecture.

AS/400 customers such as Marc Novik, director of information management at the Miami-based HealthInfusion division of Coram Healthcare Corp., are eagerly awaiting the coming makeover.



Source: Annex Research, Phoenix

Moving forward

Novik said he wants to use the AS/400 as a server for applications running on multiple platforms, and he noted that IBM appears to be "keeping in touch with what's happening in the business environment." HealthInfusion expects to start moving to PowerPC-based hardware in late 1995, he added.

Rich Kolbe, director of MIS at Harley-Davidson, Inc. in Milwaukee, agreed that the AS/400's "arrows are all pointing in the right direction" — toward client/server. "We haven't gone to great depths yet, but we've been pleased with what we've done and we plan to go further," Kolbe said.

Rebound expected

Bob Djurdjevic, president of Annex Research in Phoenix, said he expects the changes wrought by IBM to restore the AS/400 to strong growth in 1995 after three years of sluggish demand (see chart). The midrange system, which was introduced in 1988, appears to be poised on the threshold of a second life, he added.

The new hardware and software will "change the fundamental nature of the AS/400" and make it more useful in client/server environments, agreed David Andrews, managing partner at D. H. Andrews Group, Inc. in Cheshire, Conn.

However, he said application vendors probably will not be able to deliver products that take full advantage of the features being added to the OS/400 until late 1995.

Mainframes to experience more renewed growth

By Craig Stedman

The mainframe enters the second year of its new life with all signs pointing to a continued resurgence. Shipments of System/390 MIPS are expected to top the record level reached during 1994, and some analysts even project that IBM's mainframe revenue will increase for the first time in five years.

But amidst all the hoopla for a platform that much of the industry had written off just a year ago, winds of serious change are blowing. 1995 is shaping up as the first big year of transition from water-cooled mainframes to IBM's CMOS-based and air-cooled parallel systems.

IBM started shipping CMOS-based machines last spring, but the initial 13 MIPS processor is only powerful enough to handle about 25% of System/390 workloads, according to Charlie Burns, an analyst at Gartner Group, Inc. in Stamford, Conn. By comparison, traditional processors based on emitter-coupled logic technology run at up to 60 MIPS.

A second-generation CMOS engine due in May appears to have contracted from a promised 23 MIPS speed to 21 MIPS, Burns said. But that should still bulk up the air-cooled systems to the point where half of existing mainframe jobs can run on them "without people having to do any unnatural acts," he added.

As a result, Burns said the parallel machines could account for as much as 40% of IBM's mainframe revenue during 1995, up from about 15% in 1994. This is good news for customers because IBM has dropped the price of the CMOS-based machines below the cost of traditional ES/9000s, he noted.

"1995 is really the year that the true

Mainframes, *page 85*



Source: Annex Research, Phoenix

CA aligns 1995 product rollouts with OLE

OpenRoad to also gain OCX capabilities

By Thomas Hoffman

■ Many of Computer Associates International, Inc.'s 1995 product rollouts will rely heavily on OLE 2.0 technologies.

One of these will be CA-OpenRoad for Windows NT, a graphical fourth-generation language for client/server application development that will ship next fall.

OpenRoad will take advantage of Microsoft Corp.'s Object Linking and Embedding (OLE) 2.0 and OLE Custom Controls (OCX). The product's exact ship date will depend on when Microsoft delivers Windows 95, the next version of Windows, next summer.

Other CA application development tools, such as CA-Visual Objects, CA-Visual Realia and CA-Realizer, will also be outfitted with OLE 2.0 and OCX capabilities later in 1995, according to Russell M. Artzt, executive vice president of development at CA.

"My goal is to be right there when Microsoft ships" Windows 95, Artzt said.



The wait is over

Also expected to ship in March will be CA's long-awaited Novell, Inc. NetWare version of the CA-Unicenter systems management package, soon to be followed by a Windows NT version. Artzt said development of CA-Unicenter for Windows NT "has been especially challenging because of the newness of it. [Microsoft] has gone through quite a number of development changes with NT, and you just have to roll with it."

CA has also been working closely with IBM on its Distributed System Object Model (DSOM), an initiative to provide IBM shops with a common object model over distributed networks. CA is trying to make its CA-Unicenter 2.0 systems management package DSOM-compliant by the time it goes into beta testing in the third quarter of 1995, according to Yogesh Gupta, senior vice president of open systems at CA.

Availability of those products should help CA expand its growing CA-Unicenter revenue stream. For the quarter ending Dec. 31, 1994, CA-Unicenter revenue was projected to top out at $55 million, according to Charles E. Phillips, a financial analyst at Kidder, Peabody & Co. in New York.

When the NetWare and Windows NT versions start shipping, CA-Unicenter revenue should reach $80 million per quarter, Phillips said.

Flagship sets sail

CA is also emphasizing its new flagship manufacturing package, CA-ManMan/X, which it bought with the Ingres database when it acquired The ASK Group, Inc. last June.

Artzt said CA is currently developing multiplant support for the Unix-based manufacturing package. A new release of CA-ManMan/X with those features should ship by late 1995, he said.

On the way

CA is readying gateways that would allow its CA-IDMS and CA-Datacom mainframe database users to share data and applications with its CA-OpenIngres Unix-based database management system. Gateway connections among the databases are scheduled for beta testing in March with shipments planned for June. Replicators — to allow data produced in one environment to be reproduced in the other — should be released in late 1995.

Digital vows to return to profitability in 1995

Analysts say company is positioned for success

By Neal Weinberg

Digital Equipment Corp. faces a make-or-break year in 1995 as it battles to get back in the black.

Digital has not had a profitable year since fiscal 1990, and its losses since then have totaled a staggering $5.8 billion. The company has laid off more than 30,000 people — 25% of its workforce — in the past couple of years.



CEO Robert Palmer *has set a goal to make Digital profitable by the end of June*

Chief Executive Officer Robert Palmer has set a goal of profitability by the end of June, and most analysts say that can be achieved if the company executes its game plan.

On the cost side, Palmer's decision to do away with matrix management in favor of a more streamlined business unit approach as well as the company's move toward indirect sales channels give the company more opportunity to cut back in those areas, said Brad Day, an analyst at Dataquest, Inc. in Framingham, Mass.

At the same time, Digital has to show revenue growth, especially from the company's Alpha AXP workstations and servers, Palmer said.

"They seem to be coming out of the tunnel, although the final grades aren't in yet," said Francis B. Brake, managing director of technology business development at Newport News Shipbuilding and Drydock Co. in Newport News, Va.

Brake said he is impressed with the Alpha chip technology and that Palmer is "doing at least as good a job as any other executive in that industry." He added that Digital may have "hit a couple of stumps in the road," but he still views the company as a "viable souree of solutions."

Wes Melling, an analyst at Gartner Group, Inc. in Stamford, Conn., said one of the major growth opportunities for Digital is Microsoft Corp. Windows NT clusters. He said Digital is "as well positioned as anyone" to take advantage of NT growth next year.

Digital's other challenge is "to figure out how best to work with the loyal installed VMS base," Melling said. He said it remains to be seen if Digital can meet that challenge.

There are positive signs for Digital: Revenue in the latest quarter was up 4%, the company's stock price has nearby doubled in the past six months from a low of about $18 a share to a current price of about $34 a share, and sales of PCs and Alpha workstations and servers are ramping up.

Up, up and away

Alpha AXP workstation and server sales increased 164% in fiscal year 1994, according to company figures.

"A lot depends on the last quarter of 1994," said Jim Brennan, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H. Digital has to show progress toward profitability or risk losing credibility with customers, he said.

In early 1995, Digital will roll out new Alpha AXP workstations and servers based on the faster, more powerful EV-5 chip. Digital will also come out with models to augment its successful PC offerings.

On the software side, Digital will offer a new version of LinkWorks groupware. And in networking, it will emphasize Asynchronous Transfer Mode products.

Briefs

EA Systems makes buy

EA Systems, Inc. in Alameda, Calif., has purchased **Digital Equipment Corp.**'s Plant Applieations and Systems for Concurrent Engineering (PASCE) software business. PASCE is a database-driven plant design and management system. EA Systems will focus on providing software to the power and process industries for plant life cycle management.

Arbor releases upgrade

Arbor Software Corp. announced an upgraded version of its multidimensional database system that includes a user interface with the same look and feel as Microsoft Corp.'s Office.

HAPP

(What else would you expect from a company

You know what you're doing next quarter. But next year? Or the year after? Or the year after that? and use information to see where they need to go, and to get there. With that in mind, we'd also

Mainframes

CONTINUED FROM PAGE 83

mainframe alternative becomes real," agreed Carl Greiner, an analyst at Meta Group, Inc., also located in Stamford. "It's a set-up year where we'll start to see the end [of water-cooled purchases] except in the really big shops."

Some mainframe shops are champing at the CMOS bit, spurred on not only by lower costs but by a promise of increased flexibility that the air-cooled technology is supposed to bring to the System/390 environment.

Jawaid Ekram, director of systems and technology at Galileo International in Englewood, Colo., said the online reservation consortium wants to start migrating to CMOS in mid-1995. "People like us running transactions can get by with 21 MIPS" per processor, he said, although most batch-processing applications still require more power.

Besides reducing the cost of mainframe computing, the new technology's parallel nature should improve resource management by making it easier to switch CPUs to different workloads as processing needs fluctuate, Ekram added. That could help during Galileo's heavy processing cycle at month's end, he said.

Greg Dzieweczynski, technical manager for database services for the state of Minnesota in St. Paul, said the state is also considering moving to a coupled sysplex based on CMOS technology in 1995. The air-cooled machines will be much more appealing once the faster processors are available, he said.

However, Dzieweczynski added that the state will reopen the matter next summer to see if it wants to delay the migration, which would also require updating all of its mainframe software. "It's a big step just to get to the fork in the road where you can go to the CMOS technology," he said.

Client/server suite trend continues

By Rosemary Cafasso

The trend toward integrated client/server applications suites — which helped propel SAP America, Inc. and Oracle Corp. to the top of the market in 1994 — will continue in 1995.

This means the big names will continue to dominate this arena, while smaller and more narrowly focused firms such as Platinum Software Corp. and Coda, Inc. will have to devise more schemes and partnerships to provide users with full suite-like solutions. Both Platinum and Coda focus on financials.

"They either have to come up with all the functionality, or they'll have to come up with a very straightforward integration approach," said Harry Tse, a research director at The Yankee Group in Boston.

The movement to suites shows that users "are trying to cut down the number of vendors they do business with," said Jeff Comport, an analyst at Gartner Group, Inc. in Stamford, Conn.

However, Comport said he does not expect this shift to big-name suite suppliers to cause a shakeout — yet. "We see more vendors than the market can support, but there's still a window of opportunity in 1995 and 1996 to differentiate themselves," Comport added. "We predict by 1997 there will be a shakeout that removes up to one-third of the vendors."

On the technology side, analysts said they expect 1995 to be the year when workflow assumes a key role in client/server applications. For example, after more than a year of talking about it, PeopleSoft, Inc. will roll out workflow capabilities as part of its application line in 1995.

At least one analyst said Microsoft Corp.'s Windows NT will get a shot in the arm next year in the client/server applications front.

While NT will not overtake Unix as the most frequently used operating system anytime soon, "it will take a real rush at Unix," said Ed Black, an analyst at Aberdeen Group in Boston.

The wild card in 1995 will likely be Computer Associates International, Inc., which has rolled out a set of multiplatform accounting packages and has the marketing might to take on SAP and Oracle, analysts said.

What's up for some of the big names in client/server software:

SAP America is expected to deliver R/3 "lite," a scaled-down version of its integrated client/server software now in the labs under the code name Heidelberg.

PeopleSoft said it will launch several additional financial software modules.



D&B Software will focus on pushing its own integrated suite, which was just completed in late 1994.

Oracle will ship its first full-blown graphical user interface client/server applications.

Y 1998

that can help you realize your long-range vision?)

For over 30 years, we've been helping companies work with technology to create
like to wish you a happy 1999. 2000. 2001. 2002. You get the idea. (800) 566-9337, x1800.

EDS

OpenVMS.

When not working *is* not *an* option.

When it comes to functions that are critical to the lifeblood of their companies, over 10 million Digital users rely on our OpenVMS™ Client/Server environment.

No other operating system can beat the clustering features of OpenVMS for data integrity and security. No mainframe can match its scalability and high availability. With OpenVMS, your data is safe, secure and always there.

And because it complies with industry standards, like those from X/Open, you can choose from thousands of OpenVMS applications—or customize your own.

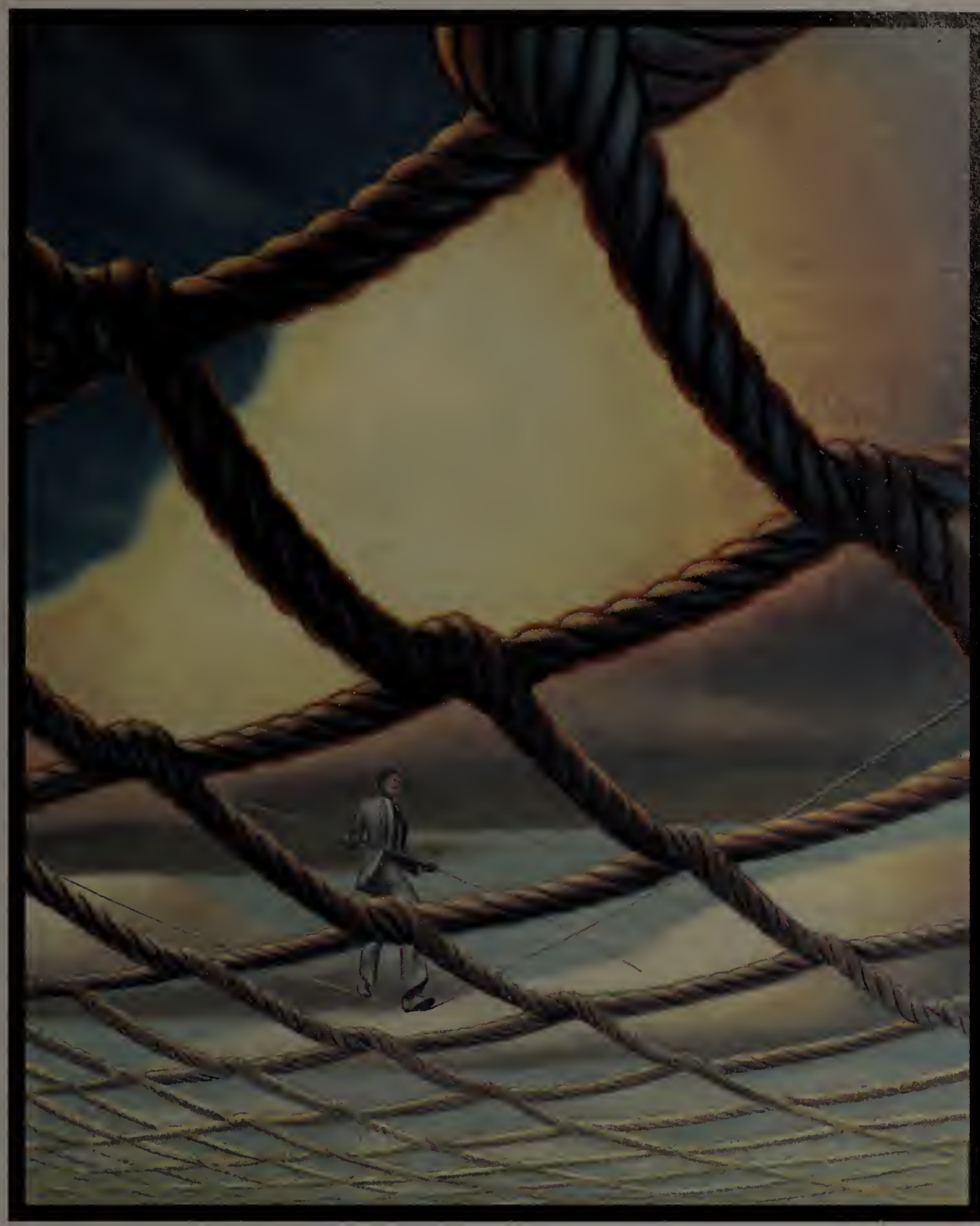
It's also an ideal platform for integrating virtually all your hardware and software.

In fact, a recent IDC survey found that OpenVMS users are implementing Client/Server multivendor integration faster than users of IBM® MVS,® OS/400® or UNIX.®

Not only that, but OpenVMS runs on Digital's blazingly fast 64-bit AlphaServer™ and AlphaStation™ families, the same flexible systems that also run DEC OSF/1® UNIX® and Windows NT.™ With Alpha, OpenVMS is setting new industry records for price/performance. So, OpenVMS is not only a safe investment, but a smart one too.

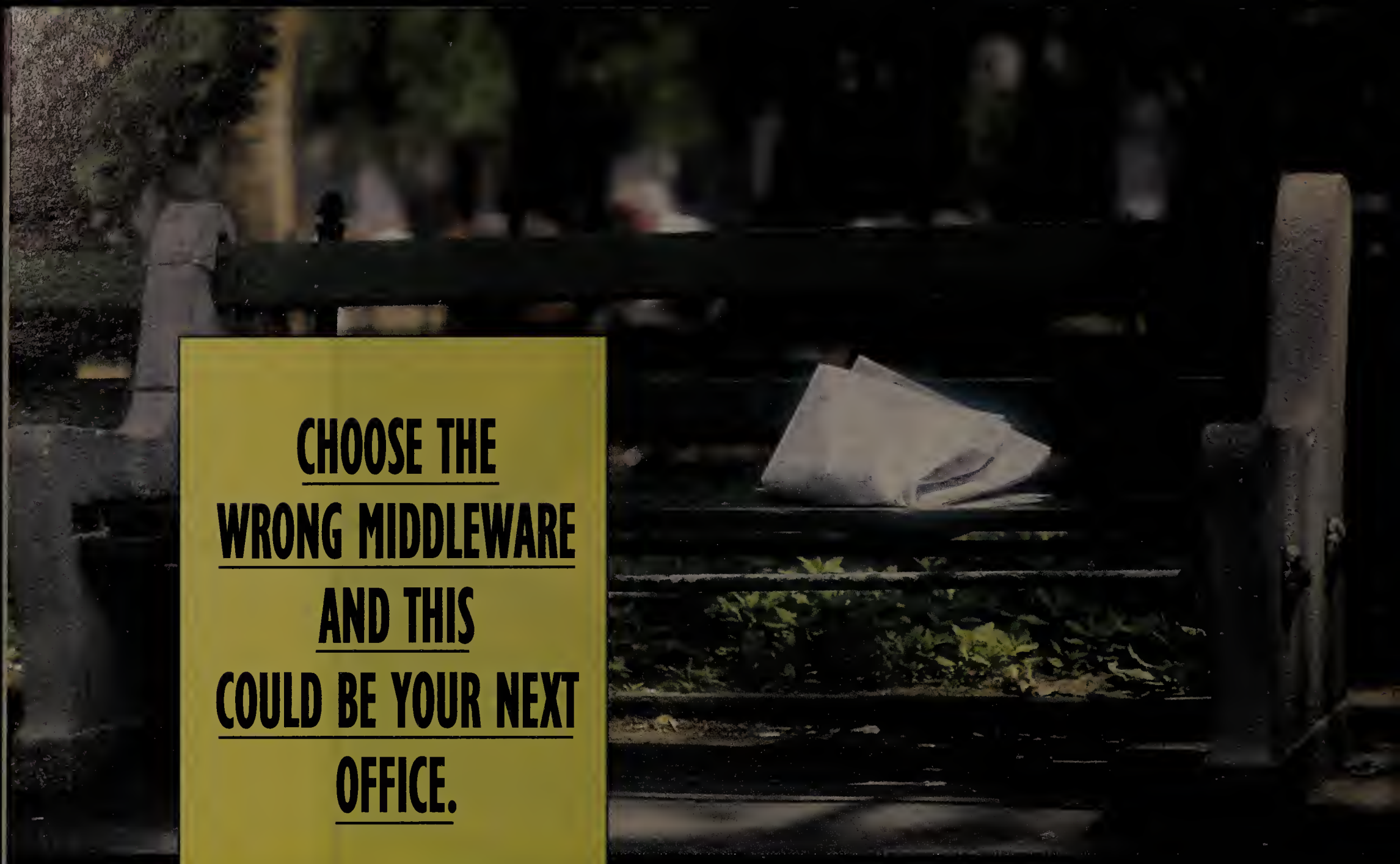
Call your Digital Business Partner, 1-800-DIGITAL, or reach us via our Internet address: moreinfo@digital.com.

UK: © Digital Equipment Corporation, 1995. Digital, the Digital logo, OpenVMS, AlphaServer and AlphaStation are trademarks of Digital Equipment Corporation. OSF/1 is a registered trademark of Open Software Foundation, Inc. UNIX is a registered trademark licensed exclusively by X/Open Company, Ltd. Windows NT is a trademark of Microsoft Corporation. IBM, MVS and OS/400



digital™

are registered trademarks of International Business Machines Corporation.



CHOOSE THE WRONG MIDDLEWARE AND THIS COULD BE YOUR NEXT OFFICE.

Although there's a growing number of vendors who claim to provide middleware solutions, choosing the wrong one could have disastrous results for you and your company.

Most middleware vendors provide only limited solutions. Access to only certain databases and computer systems, limited support for new emerging standards, restrictions on network protocols and new deployment platforms. Choose one of these vendors and your open computing environment today will become your closed environment tomorrow.

INTRODUCING EDA/SQL® RELEASE 3

Information Builders' new **EDA/SQL Release 3** gives you the flexibility to set your own standards for truly open client/server computing... both today and in the future.

Whether you want to retrieve, join or update data, we guarantee transparent SQL access to virtually any database – both relational and legacy – across more than 35 computer platforms. We support more front-end tools than any other middleware vendor and let you choose from today's most popular communications options. We provide copy management facilities for replicating data located in over 60 file formats. And we offer complete compliance to new and de facto open standards such as ODBC, DB-Lib, X/Open, and DCE.

EDA/SQL Release 3 gives you unrivaled performance for OLTP and DSS applications. Special query optimization features provide fast, efficient distributed processing. And our unique **SmartMode**™ option prevents expensive runaway queries. Best of all, **EDA/SQL Release 3** comes with a new pricing structure that offers the best price/performance value in the industry.

Bottom line, **EDA/SQL** middleware is the only choice for open client/server computing today and tomorrow. The other choice. . . how about an open office?

For more information, to attend a **FREE** seminar or to receive a **FREE** White Paper, "Migrating to Client/Server - A Case for Middleware",

CALL 800-969-INFO
In Canada Call 416-364-2760

EDA/SQL

"There's no middle ground on middleware"

Information Builders

EDA/SQL is a registered trademark of Information Builders, Inc., 1250 Broadway, NY, NY

DBMS vendors seek to fulfill vows

By Kim S. Nash

Database makers will spend the first half of 1995 making good on vows taken in 1994.

Ironically, improving core database engines is but one item on the respective agendas of the big Unix relational players. Perhaps more important for Oracle Corp., Sybase, Inc., et al is proving they have more to offer in the coming year.

Hot tools

The No. 1 goal from the database leaders will be providing good graphical client/server development tools. Oracle is slated to unveil its much-hyped Project X tool kit in mid-January. Project X is a PC-based tool whose language is Basic, with some object functionality. The product will support Windows, OS/2 and Macintosh systems, which has worried some of Oracle's bread-and-butter Unix users who are concerned about ending up second-class citizens.

To allay that fear, Oracle plans to ship a series of fancied-up, graphical tools for Unix developers — Cooperative Development Environment 2 — during 1995's first half.

Sybase users, meanwhile, await word from the company about the fate of its near-finished Build Momentum development tools. Sybase's proposed $900 million acquisition of Powersoft Corp. in November is likely to mean the demise of Build in favor of Powersoft's tools.

At the same time, Sybase must also combat perceptions that Powersoft's products will no longer be database-neutral. This is a key selling point that helped make Powersoft so successful in the first place.

Worldwide database sales

Database type	1994	1995*	1996*
Unix relational	$1B	$1.25B	$1.8B
Mainframe relational	$1B	$1B	$960M
Workgroup-level relational**	$25M	$80M	$225M
Object-oriented	$80M	$90M	$115M

*Projected
**Multiuser database running on OS/2, NetWare or Windows NT

Source: Ovum Ltd., London

Informix Software, Inc. will be busy too, adding features missing from the first release of its client/server tool, New Era. The ability to split, or partition, application logic between server and client is due to be added by midyear. Before then, Informix has promised to add an object browser to New Era.

Aside from tools, users see a crying need for solid systems management utilities in 1995. Computer Associates International, Inc. plans to integrate its recently acquired Ingres database into its Unicenter systems management product set but has refused to specify a date for completing the work.

The Islandia, N.Y.-based CA also plans to ship upgrades of the Ingres database and related add-on products for replication and managing distributed systems in the second quarter of 1995.

Indeed, Sybase, Informix and Oracle are all working with companies that make systems management products, several of which have mainframe histories.

War unlikely

Talking strictly databases, Oracle and Sybase will make a strong run at Microsoft Corp. in the low end by creating slimmed-down versions of their systems for IBM's OS/2, Novell, Inc.'s NetWare and other departmental-level operating systems. Users should expect a thrust-and-parry situation in this market regarding pricing, although industry observers doubt it will become an all-out price war.

While Oracle and Sybase jockey for position, however, Microsoft will fight for its own chance at the big-time enterprise-caliber database arena. Microsoft's SQL Server 95 database, for example, is supposed to include some sophisticated aids for monitoring and troubleshooting remote databases from a central site. SQL Server 95 is also expected to be able to support many more users than Microsoft's current database, SQL Server 4.2.

Elsewhere, lesser known database players plan to get into some of the hotter technologies, hoping to do the big guys one better. For example, Praxis International, Inc. plans to ship OmniReplicator, a device designed to allow two-way replication between IBM's DB2, Sybase's System 10, Oracle 7 and other databases. In comparison, Oracle does not offer similar bidirectional replication; Sybase plans to offer it in first-quarter 1995.

To date, no date set

Microsoft has steadfastly refused to specify a ship date for its SQL Server 95 database other than to say that users will receive it in — you guessed it — 1995

Development tools

No clear answers for users on client/server development front

By Rosemary Cafasso

Anyone looking for clarity should stay away from the application development market next year.

Observers expect the turbulence and confusion of 1994 to roll into 1995 with no letup in sight.

Here's why: Development tools from many companies are being transformed to provide more object-based development platforms for client/server computing. These include products from low-end tool providers, database companies, start-ups pushing very high-end development tools, traditional fourth-generation language companies and the old line computer-aided software engineering companies, to name just a few.

Not getting any easier

The bad news for users is that no clearly superior approach to client/server development will emerge next year, which means decision-making will continue to be difficult.

"The two words are objects and repositories for 1995," said Curt Monash, president of Monash Information Systems in New York. "Right now, use of them is trivial. But we are on a several-year track to get fully object-oriented and highly repository-[driven]."

On the low end of the development scale, companies such as Powersoft Corp. will try to move away from the client-centric label and become enterprise-class players by adding high-level functions such as partitioning. Powersoft has scheduled rollouts of high-end functions starting in 1995 and continuing well into 1996.

Projected worldwide application development tools revenue by operating environment

	1993	1994	1995
Mainframe	$7.1B	$7.3B	$7.4B
Mini	$3.1B	$3.3B	$3.5B
Unix	$5.0B	$6.3B	$8.1B
Network OS	$245M	$335M	$442M
Windows NT and OS/2	$692M	$1.1B	$1.8B
DOS/Windows	$5.3B	$6.1B	$6.8B

Source: International Data Corp., Framingham, Mass.

Although PowerBuilder and competitors such as Gupta Corp.'s SQLWindows and Microsoft Corp.'s Visual Basic are criticized for not being enterprise-class, some observers expect this market segment to still be plenty hot next year.

"There will continue to be a lot of momentum in that area," said Judith Hurwitz, president of Hurwitz Consulting Group, Inc. in Watertown, Mass. She noted that low-end tools are a good entry point for client/server development. "People now want to build bigger things, but it is only a small segment that has already made the migration to client/server."

The lower end tools market will not be the only busy segment. The database vendors will be "rearmed and much more competitive" will tools in 1995, said Brent Williams, an analyst at Gartner Group, Inc. in Stamford, Conn. (see story above).

Hot market

The object-oriented programming market will increase from about $319 million in worldwide revenue in 1993 to about $2.2 billion in 1998, according to International Data Corp. in Framingham, Mass.

The high end of the market, which got a jump start in 1994 with launches from such companies as Forte Software, Inc. and Dynasty Technologies, Inc., should heat up as well.

"I predict there will be a lot of new products here," Hurwitz said. "If you compete against a Visual Basic, it's hard to make money. The perception is [the high end] is where the money will be."

Well-managed objects hold great promise

Cost and time savings top benefits for adopters

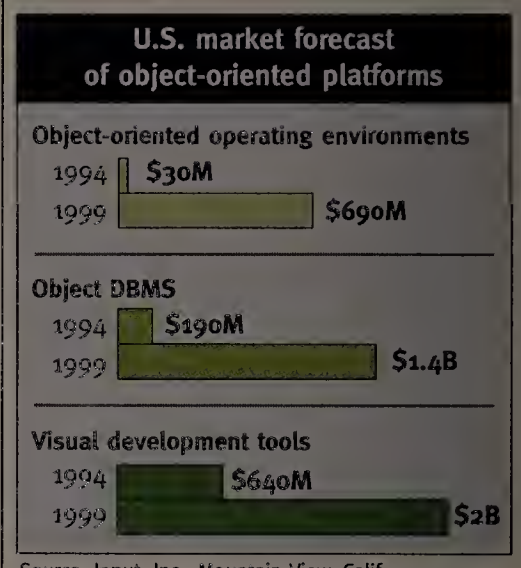
By Gary H. Anthes

The market for object-oriented technology will skyrocket during the next five years, but users will not realize its potential unless they establish an organizational and technical environment geared toward the technology.

Those are the central conclusions in a new report from Input in Mountain View, Calif. In "Object-Oriented Platforms for Client/Server Systems," Input said the U.S. market for object-oriented development tools, database management systems and operating environments will grow at a compound annual rate of 36% through 1999 (see chart).

While there is some disagreement as to just how critical object-oriented technology really is to information systems organizations right now, Input is clearly bullish on the concept. "Objects are essential for programming client/server systems of complexity," the report said. "They are reducing the time to create systems, the cost of updating them and the cost of adding additional components."

Input said that financial services, health care, document processing, government and teleeommunications users are all early adopters of object-oriented technology.



Source: Input, Inc., Mountain View, Calif.

Angela Hey, client/server program manager at Input, said there would not be a mass migration from Windows to NextStep, the object-oriented operating environment from Next Computer, Inc. "But I do see a few very high-quality organizations using NextStep and getting a competitive advantage — companies like Swiss Bank, Chrysler Financial and some of the telephone companies," she said.

Benefits for all

Even companies that do not use object-oriented tools in their development efforts may see the benefits of it via systems integrators and outsourcers, Hey said. These developers, especially the small aggressive ones, use the time savings from object-oriented approaches to move away from the traditional time-and-materials billing for development services, sometimes sharing the resulting savings with customers, she added.

Hey offered the following advice to users of object-oriented technology:

- Standardize as much as possible on a small number of object-oriented vendors and tools. Otherwise it will be more difficult to share objects across platforms.
- Have relatively senior, well-trained staffs manage the storage and reuse of objects and guide developers in the use of the technology.
- Have "product champions" who can sell the use of object-oriented technology within the company to stimulate its adoption.

Hey said organizations that have not followed this advice have often succeeded with small pilot systems based on object-oriented technology but have then failed to scale up to enterprisewide use.

Introducing Version 4.0

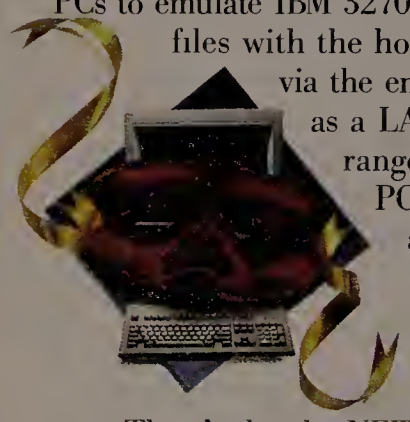
Personal Communications/3270

Emulation

Make a list of everything an emulator should be. Then add a few more lines. With the IBM® Personal Communications/3270 V.4.0, you can have it all–and more.

Power and Flexibility.

Now you can access the host mainframe from more locations, more efficiently and with more function than ever before. Running as a native DOS or Windows™ application, IBM PC/3270 allows PCs to emulate IBM 3270 display terminals, transfer files with the host, automate process via the emulator APIs, and function as a LAN gateway. With its wide range of connectivity, IBM PC/3270 is also quite a liberator. There's support for IPX/SPX (NetWare® for SAA®), TCP/IP, and Async support for out-of-office connectivity.



There's also the NEW Personal Communications Toolkit for Visual Basic,® which makes it easier for Windows programmers to integrate host data and text with workstation applications.

Great Support and Savings.

You'll also find all the support you need for the latest technologies, including the latest modems (V.32BIS and V.42BIS) and PCMCIA credit card adapters. And there are lower upgrade prices when you decide to migrate from non-IBM (Attachmate,® DCA,® Wall Data,® etc.) or IBM 3270 terminal emulators. To find out more, call 1 800 342-6672. In Canada, call 1 800 465-7999, ext. 999. With so many features, the PC/3270 is clearly greater than your average emulator.



Take a look at all that PC/3270 has to offer, and you'll see why it's the latest emulation sensation.

beyond expectation.

IBM and SAA are registered trademarks of International Business Machines Corporation. NetWare is a registered trademark of Novell Inc. MS-DOS and Visual Basic are registered trademarks and Windows is a trademark of Microsoft Corp. DCA is a registered trademark of Digital Communications Association, Inc. Attachmate and Wall Data are registered trademarks of their respective companies. © 1994 IBM Corp. All rights reserved

IBM

GIS changes spur IS choices

By Mitch Betts

■ The desktop mapping software industry underwent dramatic changes in 1994, with vendor repositioning, price cuts and revolutionary deals to embed mapping capabilities in mainstream spreadsheets.

Now, information systems managers just have to figure out how to make sense of the changes in the geographic information system (GIS) market.

1994 desktop mapping revenue

TOTAL REVENUE	$141M
Mapinfo Corp.	19.3%
Strategic Mapping, Inc.	17.1%
Environmental Systems Research Institute, Inc.	15.1%
Geographix, Inc.	6.4%
Tactician Corp.	5.0%
Intergraph Corp.	4.8%
Other	32.2%

Worldwide projected figures
Percentages do not equal 100% due to rounding

Source: Daratech, Inc., Cambridge, Mass.

As Dick Taylor, GIS director for Guilford County in North Carolina, recently put it, the GIS market has divided into three levels of functionality. At the high end are Unix workstations running heavy-duty environmental applications, while in the middle are robust PC packages such as MapInfo Corp.'s flagship product and Strategic Mapping, Inc.'s Atlas GIS.

Low end is all the fad

What is new for 1995 is the low end, where basic mapping capabilities are being embedded in new versions of popular business PC packages. Santa Clara, Calif.-based Strategic Mapping started the trend by adding a mapping feature and data to Lotus Development Corp.'s 1-2-3 Release 5.0 for Windows.

Troy, N.Y.-based MapInfo followed with an agreement to add mapping to 1995 versions of Microsoft Corp.'s Office suite and Excel spreadsheet. In mid-December, Strategic Mapping made the same kind of deal for Novell, Inc.'s PerfectOffice suite and Quattro Pro spreadsheet.

While the spreadsheet deals will bring the power of mapping to a vastly larger business audience, the new bottom rung on the GIS ladder also creates some market confusion, said Nora Sherwood, editor of *Business Geographics*, a magazine based in Fort Collins, Colo.

For the corporate IS manager, Sherwood said, the question in 1995 will be "What level of product is the right one for the next person who wants GIS? Is it Lotus' Maps, which is almost free, or a $20,000 GIS system?"

The industry goal is obviously to enlarge the market and hope that at least some spreadsheet users will want more than "mapping lite" and upgrade to the full-fledged PC software packages.

"It's too early to know how users will respond," said Bruce L. Jenkins, vice president of market research firm Daratech, Inc. in Cambridge, Mass. "Will it increase market awareness and build user demand for the stand-alone systems or will it just satisfy most users' needs?"

Moreover, the spreadsheet strategy has a dangerous side if the mapping features are too rudimentary or poorly implemented. "If they're crippled too far, it will sour the market's taste for GIS rather than expand the market," Jenkins said.

Vendors are also hinting that mapping can be embedded in other sorts of mainstream applications such as database management systems, graphics and presentation software and executive information systems.

If that happens, then IS staffers may soon be faced with managing a real hodgepodge of mapping software.

Mobile Insights '95

The Conference for Leaders in Mobile Computing and Data Communications

Marriott's Camelback Inn, Scottsdale, Arizona ▼ January 29 - February 1, 1995

Sponsored by:
(partial list)

AMD
Apple Computer, Inc
Computerworld
Cirrus Logic
CommunicationsWeek
Digital Equipment Corporation
Fleetwood
IBM
Intel
International Data Corporation (IDC)
McCaw Cellular WDD
Microsoft Corp.
Mobile Letter
Mobile Office
Motorola
OEM Magazine
PageNet
Portable Software
PC World magazine
Sharp Electronics
SkyTel
SoftArc
Upside Magazine
Waggener-Edstrom

- Hear Ralph Haller of the FCC discuss the wireless auctions
- Listen to Kevin Compton of Kleiner, Perkins, Caufield and Byers describe investment strategies in mobile and wireless
- Enjoy Dr. Ted Selker of IBM Research discussing human factors in portable computing
- Test drive the exciting new Sharp Zaurus handheld computer
- Try a Motorola NewsCard and SkyTel Windows software
- Obtain a free copy of FirstClass collaborative software from SoftArc
- Vote on important mobile issues using Fleetwood's wireless attendee response system
- Attend sessions on remote access, portable computing, wireless datacomm, displays and graphics, power management, handheld systems, messaging storage, and core logic
- Get a free copy of QuickExpense software from Portable Software
- Enjoy golf and a Super Bowl party— and win valuable door prizes— at one of the Southwest's most luxurious resorts

Produced by Mobile Computing Insights, Inc.
J. Gerry Purdy, Ph.D.,
Conference Director

To Register
(800) 593-3952
Outside the U.S.
(408) 253-6600

Not a skill, but an attitude

IN THE COMING YEAR, TECHNICAL SKILLS WILL BE LESS OF A PRIORITY FOR HIRING MANAGERS. INSTEAD, BUSINESS ACUMEN AND AN APTITUDE FOR CUSTOMER SERVICE WILL BE FOREMOST ON THEIR MINDS.

BY CHERYL GERBER

Managers won't be looking for highly skilled technical specialists in 1995, but don't drop that networking class just yet. They're planning on hiring generalists — those who possess interpersonal and business acumen *in addition* to technical expertise.

"We currently support a myriad of platforms, including PC, mainframe, Oracle Corp. and Unix applications. So we hire people who have skill sets in all those areas," says Kathryn Ziemnik, manager and assistant vice president of personnel systems programming and development at Wells Fargo & Co. in San Francisco. "We're not looking for specialists."

One of the top skills required in 1995 will be the ability to understand and analyze the link between business and technology. And demand for that skill falls foremost on the shoulders of information systems managers.

"As the role of technology has become more prominent in how business is run, one of the most important skills for IS management is strategic thinking," says Elahe Hessamfar, chief information officer at Turner Broadcasting System, Inc. in Atlanta.

IS managers must be adept at partnering with the business side to drum up strategic solutions for opportunities and not problems, Hessamfar says. "We must be proactive [and] not reactive," she says. They must also have strong consultative skills. These, as well as a strong understanding of the business and strategic thinking, are the top skills Hessamfar seeks in IS managers. "Obviously, technical skills are important, but you can always buy that," she says.



Just as the need for strong business skills cuts across all industries, so does the need for systems integration. Ziemnik is melding multiple systems in banking as are others in the health care industry.

"As we integrate patient information with laboratory and pharmacy systems, we are moving off dumb [terminals] and onto intelligent terminals. And we are moving more processing onto networked PCs," says Joe Voloshin, systems manager at Adventist Health Systems in Roseville, Calif.

"Given the direction we're going in, it's networking expertise we're looking for," Voloshin says. "They don't need to be an expert in any one system. The strong

Skills, *page 93*

"We need people who work well with others and who know the internals of the business."
—Kathryn Ziemnik
manager and assistant VP,
personnel systems programming
and development
Wells Fargo

"It's networking expertise we're looking for. They don't need to be an expert in any one system. The strong skill is going to be the ability to integrate two or three systems."
—Joe Voloshin
systems manager
Adventist Health Systems

RHI CONSULTINGSM

Information Technology Professionals

With one call to *RHI Consulting*, you access premium IT job opportunities. Elevate your career by working in leading-edge positions at the most successful, innovative firms.

RHI Consulting specializes in IT staffing and has developed the contacts necessary to further your career objectives.

And *RHI Consulting* is a division of *Robert Half International Inc.*, the world's first and largest staffing specialist in providing information technology, accounting and financial professionals with more than 175 offices worldwide. Call *RHI Consulting* today!

TECHNICAL OPENINGS FOR COMPUTER PROFESSIONALS

PROGRAMMER/ANALYSTS
- POWERBUILDER/ORACLE or SYBASE
- CA-DATACOM/DB w/IDEAL or COBOL
- DB2/SQL/COBOL
- CICS/COBOL-TELON A PLUS
- LOTUS NOTES
- AS/400/COBOL, RPG or SQL
- X-WINDOWS, MOTIF, PRES. MGR.
- SAP R/2, R/3
- ORACLE V.7 FORMS, REPRINTS, FINANCIALS
- UNIX, C, INGRES, ESQL

DATABASE ADMINISTRATORS
- SYBASE
- ORACLE/UNIX or VMS
- CA-DATACOM/DB
- DB2
- INFORMIX
- IMS DB/DC
- UNIDATA/BASIC/PICK

LAN ANALYSTS
- NOVELL, APPLETALK, TOKEN RING
- BANYAN

SYSTEMS SUPPORT
- OS/2 +LAN SERVER/WINDOWS
- VAX SYSTEMS MANAGER
- AIX/UNIX ADMINISTRATORS
- UNIX/SHELL/NFS/ WORK STATIONS
- CA-7, CA-11, JCL

MANAGEMENT CONSULTANTS
- Client/Server Systems Integration
- Financial Package Implementation
- Legacy Systems Conversion

Phoenix, AZ .....(602) 264-6488
Denver, CO .....(303) 629-1010
Hartford, CT .....(203) 278-7170
Stamford, CT .....(203) 324-3399
Metro Wash. D.C. .....(703) 243-3600
Ft. Lauderdale, FL .....(305) 763-5578
Des Moines, IA .....(515) 244-7060

Chicago, IL .....(312) 616-8200
Boston, MA .....(617) 951-4000
Metro Detroit, MI .....(810) 524-3698
Minneapolis, MN .....(612) 339-9001
St. Louis, MO .....(314) 878-9975
Edison, NJ .....(908) 225-5577
New York, NY .....(212) 687-7878

King of Prussia, PA .....(610) 337-7309
Nashville, TN .....(615) 360-8065
Dallas, TX .....(214) 363-3300
Houston, TX .....(713) 688-9614
Seattle, WA .....(206) 443-8880

©1994 Robert Half International Inc. EOE

DATABASE ADMINISTRATOR

We are Galileo International, the world's largest and first truly global computer reservations service (CRS) company and the world's leading supplier of automation for travel agencies, serving about 30% of the world market.

We currently have a position available for an individual with a minimum 5 years IDMS Application Database Administration support experience. BS in Computer Science preferred. Strong interpersonal skills essential.

Responsibilities include: business requirements validation; data modeling activities; logical/physical database design; DB support and system coverage; performance and tuning; DB backup and recovery procedures; and Application design and debugging support.

If you desire to participate in a creative, highly productive and dynamic work environment and possess the technical qualifications, we invite you to learn more about our excellent benefits-including flight privileges. Send resume to: **Galileo International, Dept. MJB-195, P.O. Box 3194, Englewood, CO 80155.** Equal Opportunity Employer. We encourage minorities, females and disabled persons to apply.

GALILEO
INTERNATIONAL

Skills

CONTINUED FROM PAGE 92

skill is going to be the ability to integrate two or three systems."

Voloshin says he is not looking for a Novell, Inc. certified NetWare engineer but for someone with knowledge of TCP/IP. "TCP/IP is a big one. Knowing how to use TCP/IP to integrate systems, how to take it from a local- to a wide-area network [and] how to configure and run it is probably more advantageous than knowing how to program a language now," Voloshin says.

Understanding networking is also a priority for Tom Andrews, director of technology services at Ball Corp., a glass and aluminum can manufacturer in Broomfield, Colo. "People who were only interested in operating systems now need a broader knowledge of network protocols such as TCP/IP," he says.

Burlington Air Express, Inc. in Irvine, Calif., has also upped networking on its list of desirable skills. The firm recently began replacing 120 IBM midrange systems with Unix LANs based on Hewlett-Packard Co.'s HP/UX, HP 9000 workstations and TCP/IP. Its top priority is to hire eight people with Unix, database and TCP/IP skills. "I'm looking to hire these people as we speak," says John James, Burlington Air's director of telecommunications and midrange processing.

James says he is looking for people who can switch their technical skills midstream. "We need people who are adaptable because change is constant. There's more flexibility with software in the Unix LAN environment," James says.

Change may be the theme that drives the IS skills that managers seek. Yet that ability may be one of the hardest skills to find. IS professionals "are agents of change, yet we are just as resistant to change as everyone else," says Patrick Hansen, CIO at UniHealth, Inc. in Burbank, Calif. "But we have a strategic plan here which envisions a significant amount of change. Subsequently, we need people who want to deal with change."



Stiff competition

Increased competition in the health care industry has raised IS departments' concern for financial performance but has also improved productivity and quality. With that, there is greater concern that IS staffers possess a keener understanding of the business and better interpersonal skills. Consequently, Hansen says he now looks for nontechnical skills first.

"I look for an ability to communicate well with customers. It's not a skill but an attitude. We need people who see their job as a customer service job first, not as a technical job," he says.

Now that the team-centered approach and client/server computing have arrived, IS professionals seem more concerned about hiring people who have the interpersonal skills needed for teamwork.

"We are moving into more teamwork instead of the entrepreneurial style that helped us to grow to where we are now. We are looking for [soft skills] now — the ability to communicate and to empathize," says Stanley Kober, associate director of litigation systems at Pfizer, Inc., a research-based health care manufacturer in New York. "If a team is going to work well together, the members must be able to understand each other and to compromise."

Clearly, the days when business tolerated or felt intimidated by technical jargon are gone. Now it's up to IS to communicate technical concepts effectively in business terms.

And as business becomes more integrated with technology, the lines between technology and business will fade. The technicians of today will become more businesslike tomorrow. "In the future, it will be harder to recognize the difference between the CIO and the vice president of operations," Hessamfar says. "The CIO will take a major business role just as technology becomes a more integral part of business." ■

Gerber is a free-lance writer in San Francisco.

"I look for an ability to communicate well with customers. We need people who see their job as a customer service job first, not as a technical job."
— Patrick Hansen
CIO
UniHealth

"One of the most important skills for IS management is strategic thinking. Obviously, technical skills are important, but you can always buy that."
— Elahe Hessamfar
CIO
Turner Broadcasting System

This is your section, so tell us what information you need. The most efficient way to send career-related ideas, questions and comments is via E-mail to careers@cw.com.

CAREERENGINEERING

Information Systems Executives

Source has been retained to locate Directors with experience managing 35-100 information systems professionals who will lead the conceptualization, development and implementation of strategic systems.

Director, Systems Development
Lead the movement of a mission critical system to a client/server architecture using rapid application development, object tools and methodologies. Experience required includes proven accomplishment with progressive environments and a customer focus. **Code ISE-1**

Director, Data Architecture
Spearhead the strategic vision for enterprise-wide data modeling, data architecture and data dictionaries. You must have experience decoupling data from an application bound structure to an independent corporate model. **Code ISE-2**

Information Processing Directors
Build a state-of-the-art operations center with experience in one of the following areas: Telecom Operations, Data Center Operations, Data Center Consolidation, Distributed Systems Deployment or Business Continuity. **Code ISE-3**

Professional Services

Join high profile professional services firms and software vendors that are developing next generation systems for corporate America. These positions are for highly motivated individuals who want to supercharge their career and be poised for rapid advancement.

Big 6 Opportunities
Several practices within a prestigious Big 6 firm are hiring experienced systems professional with a variety of technical skills including PowerBuilder, COBOL/DB2 and requirements analysis. These positions provide exciting development projects and a fast track to future success. **Code PS-1**

Client/Server Application Developers
A young, entreprenеurial firm with a solid industry reputation is looking for strong C application developers, GUI tool experts and database developers for full life cycle projects. **Code PS-2**

Sybase/Oracle Database Developers
Create large database systems in a three-tier client/server environment using both Sybase and Oracle. Experience developing user interfaces with the intrinsic vendor toolsets or third party offerings such as PowerBuilder or SQL*Windows is required. **Code PS-3**

Telecommunications Industry

Join one of the most rapidly changing industries of the decade and build a career that will position you for success in the future. With the advent of cellular, broadband and satellite technologies, the telecommunications industry is poised to provide critical business and consumer products and services.

Development Managers
Lead the effort to design, develop and implement extremely high profile systems with teams of 10 to 50 professionals. Backgrounds required include object systems, client/server environments or distributed mainframe systems. **Code TI-1**

Systems Architect
Design state-of-the-art application and production environments in an open systems environment. Required technologies include UNIX, communications protocols such as TCP/IP and experience with distributed data. Object experience is preferred. **Code TI-2**

Business Analysts
Conduct business requirements analysis for new application systems in the billing systems arena. Must have employed function point analysis and have a proven track record of delivering results quickly. Data modeling experience highly preferred **Code TI-3**

SOURCE Services

8614 Westwood Center Drive, Suite 750
Vienna, VA 22182
703-790-5610 Fax: 703-790-1331

The Software Market Leader

One Company, One Product Line, One Purpose

Major Account Sales Executives

Must have excellent, proven sales records with major software companies. Demonstrated skills in winning large international accounts is essentiol.

Project Managers and Application Consultants

Pre- ond Post-Sales Consultants with in-depth experience in manufocturing, logistics and supply chain, accounting, EDI or plant maintenance. Consultants are likely to be ex-industry Managers or Directors. Post-Sales Consultants must hove extensive international project management experience.

Software Development Professionals

Leading-edge technology. Anolysts ond Team Leaders with strong technology skills including OO, CASE ond database experience. Qualified candidates must have proven technicol skills and a desire to work on the cutting edge.

BPCS

SSA

One Company

With 1994 revenues of $334 million, SSA is the world's lorgest software compony marketing application softwore for use on the AS/400. Over the last 18 months, SSA has mode major investments to moke its world-famous, award-winning BPCS™ applicotion software ovailable on Open Systems such as HP 9000 and RISC System/6000. This has put SSA in the unique position of being able to offer the same platform-independent client/server application software on Unix or AS/400 systems.

SSA now seeks the industry's top sales, services, and development professionals to exploit these fast-growing morkets.

One Product Line

SSA's integrated product line, BPCS, provides business process re-engineering and integrotion of all operaitons including configurable monufacturing processes, supply chain monagement, and globol financial solutions. SSA's inieroperable tool set allows the production of platform-independent client/server opplicotions.

One Purpose

SSA is o leading provider of cost-effective business enterprise information systems to the industriol sector worldwide.

All trademark names ore recognized os proprietory to iheir owners.

Rewards

Industry-Leading Earnings Package

A highly attractive compensation pockoge including outstonding eornings opportunities and comprehensive benefits.

Location

Opportunities based in SSA's Corporate and North American Headquarters in Chicogo, Illinois as well as vorious U.S. branch offices. Sales, Project Management, ond Applicotion Consultont positions require extensive trovel.

If you possess the required skills ond wish to become port of an exciting and rapidly growing orgonization, please write ond forword o copy of your resume to:

Human Resources

SSA, Inc., Corporate Heodquarters

500 West Madison, Chicago, Illinois 60661

An equal opportunity employer.

System Software Associates, Inc.

SSA

...On to the MILLENNIUM!

Contract with Tech Specialists in 1995

Tech Specialists is known for our "best-in-class" status in the contract service industry. This level of accomplishment is a direct result of the quality of our skilled and highly talented technical staff and our excellent relationships with our client companies. We draw on more than 30 years of experience in the contract staffing industry. Our consultants enjoy unparalleled service commitments, as well as a comprehensive benefits plan. We believe our consultants deserve a bright and prosperous 1995...don't you?

We currently have a number of challenging opportunities in the following IT Areas:

- *Telecommunications*
  - *-Conceptual-level design of ATM Architecture*
- *Client/Server*
  - *-Design and development of large-scaled RDBMS*
- *Legacy Systems*
  - *-Re-engineering of mission critical on-line systems*
- *PC/LAN Support*
  - *-Systems Integration; LAN Administration; Troubleshooting*
- *Object-Oriented Programming*
  - *-Full-cycle development of commercial applications*



Call the Tech Specialists office nearest you, or internet TechSP@ace.com

Boston, MA: 470 Totten Pond Road, Waltham, MA 02154. 617-890-2727; 617-890-1672 (fax)

Raleigh, NC: 5711 Six Forks Road, Suite 308, Raleigh, NC 27609. 919-870-5100; 919-870-7274 (fax)

Atlanta, GA: 6151 Powers Ferry Road, Suite 650, Atlanta, GA 30339. 404-933-0111; 404-933-9338 (fax)

Tech Specialists

Precision Staffing. Superior Service.

Sunbelt Opportunities

CICS/DB2 P/A's ..... TX, NC, FL, GA, VA
AS/400 P/A's ... TN, MD, VA, NC, TX
TANDEM P/A's ..... OH, NC, VA, TX
UNIX/C++ P/A's ..... NC, TN, FL, KY, AZ
PC (OS/2, C) P/A's ..... NC, SC, AZ
ORACLE/SYBASE DBA's ... VA, CO, FL
DB2/CICS/IMS S/P'S ..... VA, TX, WI
Bank P/A's ..... AZ, AL, NC, TN, GA
POWERBUILDER P/A's ..FL, NC, VA
CASE Tools S/A's ...NC, VA, GA, IN
SAP P/A's, S/A's .....Nationwide
EDI Auditors .....IL, TN, TX, AL, NC

PERMANENT FULL-TIME POSITIONS, some contracts. National recruiting firm, 13 years in DP recruiting, over 500 affiliates nationwide. Opportunities in the Southeast, Southwest & Nationwide. Fee paid.

SUNBELT RECRUITERS
2235-400E E. Flamingo Road
Las Vegas, NV 89119 • (702) 369-2066
Attn: Rick Young C.P.C.

CONSULTANTS SHOULD CONSULT

MIMI

IMMEDIATE CONTRACTS

Please send resume & call
Mimi Simon Assoc.
90 West St., Suite 1105, NYC 10005
(212) 406-1705
FAX (212) 406-1768

ECOM ECOM is a DP consulting company serving fortune 500 companies since 1978. ECOM's quest is to provide our employees with challenging and rewarding opportunities while providing superior service to our clients. Join ECOM's team as either a permanent or contract employee by using your expertise with one of the following skills:

- ORACEE CASE Configuration Specialist
- CC:Mail Administrator
- SAP
- Visual Basic
- Lotus Notes
- IDMS
- RoboHelp
- Powerbuilder
- IDMS

Please call or fax resume to: ECOM - Elite Computer Consultants Inc.,10333 NW Fwy Ste 114, Houston, TX 77092, (713) 686-9740, Fax (713) 686-9454

EXCELL • In • Every • Dimension.

Providing Software Solutions through Consulting, Projects, and Support

Excell Data Corporation is among the Pacific Northwest's fastest growing consulting firms - offering custom applications and innovative support solutions that help businesses make the most of their computer resources.

We seek professionals who excel at problem solving for both in-house project development and client consulting engagements. Our excellent opportunities in **Seattle and Portland** include:

• VB/Access	• DB2/CICS/CSP
• SQL Server/Sybase	• Business Systems Analysts
• AS/400	• PowerBuilder
• C++/Windows/UNIX	• Networks
• Software Tester	• Oracle Developer

Excell's entrepreneurial culture values continual growth of your technical and professional skills. We offer flexible benefits, training opportunities and affiliation with a dynamic group of professionals who believe **Excell** is *the place to be*. Mail or fax your resume to:

EXCELL
Excell Data Corporation

EXCELL Data Corporation, CW,
P.O. Box 53408, Bellevue, WA 98004,
PHONE: (206) 462-0965, 1-800-5-EXCELL,
FAX (206) 462-2460, Internet: excell@excell.com
Equal Opportunity Employer.

Microsoft SOLUTION PROVIDER

CONSULTANTS

At COMSYS, you'll maintain your edge with leaders.

COMSYS, a progressive national computer consulting organization, provides support to Fortune 500 clients around the nation. We've been committed to information technology since 1979 and with over 600 consultants, we continue to excel at a record pace.

We're looking for accomplished software development consultants who seek greater challenge and the opportunity to participate in the leading edge of future technology. At COMSYS, you'll maintain your edge in the company of leaders.

OUR LOCATIONS INCLUDE:

- **Washington, DC** (800) 9-COMSYS fax (301)921-3700
- **Dallas, TX** (800)653-7636 fax (214)701-0801
- **Atlanta, GA** (800)562-7882 fax (404)393-0367
- **Phoenix, AZ** (800)7-COMSYS fax (602)252-3090
- **Colorado Springs, CO** (800)288-2667 fax (719)260-0030
- **RTP, NC** (800)3-COMSYS fax (919)460-1010
- **Seattle, WA** (206)322-7005 fax (206)322-7159

You can bring it all together with COMSYS. We offer an excellent compensation and benefits program including health/dental, 401(k), flexible spending, and more. If you're interested in joining a leader, please send your resume to: **COMSYS Technical Services, Attn: ICWXX0102, P.O. BOX 7947, Gaithersburg, MD 20898-7947. Internet: 574.5283@mcimail.com.** EOE/M/F/D/V.

COMSYS®
computer project support
"Providing Technology Through People"

CONSULTANTS

INTERSOLV, the one-stop shopping center for client/server software for the professional developer, is looking for consultants to help support, mentor and train customers on INTERSOLV tools. We are recruiting individuals to join our Implementation Services Group who can consult on the use and installation of our software products with major clients. Extensive travel required.

ANALYSIS AND DESIGN CONSULTANTS
Work with clients on the use of Excelerator II in their environments. 2-3 yrs. experience in structured analysis/design and structured methodologies. 1-2 yrs. exp. with Excelerator II, object-oriented design/analysis or competitive products (ADW, Bachman).

CLIENT/SERVER CONSULTANTS
Mentor and train customers on the use of software configuration management tool, PVCS. 3-4 yrs. exp. programming or consulting in a client/server environment. Knowledge of Windows, query languages, RDBMS (Sybase, PowerBuilder).

INTERSOLV
3200 Tower Oaks Blvd
Rockville, MD 20852
Fax 301-230-3314
Attn: K. Mullikin

INTERSOLV

What will it take to move ahead in '95?

If you want to excel, you belong with a company that can provide hands-on challenges, sophisticated resources and exciting potential. That company is Martin Marietta, a world leader in information technology products and services for government and commercial customers. And this is the time to make your move. The following openings exist for degreed professionals to help develop the right applications and systems to meet our customers' diverse needs. Join us now and make 1995 *your* year to excel.

METRO WASHINGTON, DC

Lotus Notes Specialists
Lotus Notes design, development, implementation expertise, certification

UNIX Systems Programmers
2+ years of experience with UNIX, C, Sun systems, client-server programming, installation, upgrades, maintenance

Systems Programmers
Hands-on knowledge of IBM mainframes (MVS/ESA, MVS/XA, VM), Assembler, CICS, CA 1

Resource Management/Capacity Planning Specialists
5+ years with MVS/ESA/DB2 performance analysis and tuning

Software Engineers
Design and develop systems using OO, C++, Ada, NeXTSTEP, GUI, ARC/INFO; full software lifecycle development

Openings in Washington require U.S. citizenship; individuals who have undergone an SSBI, or are willing to undergo such, are preferred.

DENVER, CO

Senior Data Modelers
Support new client-server applications; data and IDEF modeling, JAD, CASE tools, Sybase, Oracle, DB2

Client-Server Specialists
3+ years with SQL, Sybase, Oracle, Informix, PCs (Windows or Mac), UNIX, 4GL, GUI

Senior Database Administrators
8-10 years in DEC VAX database administration, design, implementation, performance and tuning; DEC VAX tools (DBO, RMU), CDD Data Dictionary, manufacturing systems (MACPAC/D), UNIX RDBMS (Sybase, Informix) or MVS IMS/DB2

Programmer/Analysts
5+ years with COBOL, IMS, DB2, TSO, JCL on IBM; 2 years with Easytrieve; 1 year with ENGLISH language and CYBORG benefits systems

MINNEAPOLIS, MN; BURLINGTON, VT

Software Design Engineers
Design, document, test and maintain software for embedded microprocessor applications; 1 year with Ada; 2-4 years in software development and documentation to DOD-STD-2167, 2167A, 498

MOORESTOWN, NJ

UNIX Systems Programmers and Administrators
Plan, implement and maintain computer systems and related software on networks composed of some or all of the following: HP, Sun, Silicon Graphics using C, C++, Ada, Oracle, Ingres, UNIX or VMS

VALLEY FORGE, PA

Senior Database Architects
12-15 years in design, implementation and maintenance of databases (MIS and scientific) for VAX/VMS and UNIX environments and Ingres, Sybase, Oracle and Empress platforms; chief database architect assignments

UNIX Systems Administrators
3+ years in large Sun/HP environment; UNIX shell and C programming; Ethernet, TCP/IP, routers

VALLEY FORGE, PA; PRINCETON, NJ

Software CM Engineers
Software configuration management at the program level; Sun UNIX and VAX/VMS; commercial and military environments

Software Design Engineers
Real-time software development for spacecraft simulation, on-board flight, ground control systems, satellite operations; Ada, C, C++ with X-Windows, MOTIF, LABVIEW, UNIX, VAX

VALLEY FORGE, PA; ATLANTA, GA; BIRMINGHAM, AL

Object-Oriented Designers
OO instruction and mentoring to commercial clients; systems integration

Senior Systems Engineers
Design and develop systems architecture and total solutions for complex commercial challenges; GUI, OO, databases, client-server environments

ORLANDO, FL

Software Design Engineers
Flight and armor training systems; real-time Ada software development and support environments (Sun workstations, CADRE Teamwork Ada, Ada compilers and run time systems); C/UNIX, X-Windows, Sun OS

Real-Time Software Design Engineers
5+ years developing real-time software for multiprocessor configurations; C, 680XX and 88110 processors, Sun/UNIX workstations, training/visual systems

Lead Database Engineers
Design, implement and test visual databases used in the creation of video arcade games; 2+ years with commercial graphics and tools (e.g., PhotoShop, Soft Image); Sun/UNIX workstations, image processing and text applications

Database Engineers, Applications Development
10+ years with visual system databases residing on image generator, workstation or PC-based platforms; strong animation, video production and demonstration skills

Your next career adventure is about to begin ... at Martin Marietta. For consideration, please fax your resume to Dept. OA9501F at (703) 821-3521 or mail to our central staffing office at: Martin Marietta, Dept. OA9501F, P.O. Box 8048, Building 10, Room 1019, Philadelphia, PA 19101. Please note: Resumes are scanned into our corporate-wide resume tracking system, based in Philadelphia, and made available to participating Martin Marietta businesses for up to one year. If you are applying for a specific opening, your background will be carefully considered for that position as well as other suitable opportunities throughout the Company. An equal opportunity employer.

MARTIN MARIETTA

THE FINEST TECHNICAL TALENT & LEADING-EDGE TECHNOLOGIES KEEP US AHEAD.

Ryder System's focus on being the best in the transportation services business drives us to constantly examine and enhance our technological capabilities. With $4-billion in revenues, record profits and increasing market share, we're currently involved in an exciting re-engineering of our operations. We are looking for some of the finest minds to become part of our team, to use the latest technologies, and to help us achieve new levels of excellence worldwide. Join us for unsurpassed challenge, reward and growth potential!

SR. MANAGER, CLIENT/SERVER TECHNICAL SERVICES

Requires 3-5 years management experience of a Novell LAN administration group supporting multiple distributed LANs connected via WAN. Experience with system management tools (NMS, Spectrum) and centrally based remote administration of LANs preferred. Background with large (100+ servers and 2000+ nodes) WANs preferred.

SR. MANAGER, NETWORK MANAGEMENT

Requires 3-5 years management experience of a multi-platform, multi-protocol LAN and WAN network management support group, and background in 3745, SNA, TCP/IP, Token Ring, Cabletron hubs, and Cisco routers. Experience with WAN service providers, frame relay, Spectrum preferred.

PROJECT MANAGER, TECHNICAL SERVICES

Requires 5+ years project management experience and a solid understanding of project planning, project control, resource scheduling and systems development methodology. Must also have basic understanding of data center/technical services function.

PROJECT LEADER, SOFTWARE DEVELOPMENT

Requires 4-year degree with emphasis in systems maintenance technology to manage systems maintenance project development. Will provide expert maintenance process knowledge during software development; develop new processes to support maintenance vision; identify and implement effective training and change management strategies.

IMS DB2 PERFORMANCE ANALYST

Requires 3-5 years IMS DB/DC and DB2 tuning experience. Must be familiar with IBM and other vendor products related to data hase management.

CAPACITY & PERFORMANCE ANALYST, NOVELL LAN

Requires 3-5 years experience in the capacity and performance monitoring, tuning, and problem diagnosis/resolution of Novell LANs, gateways, etc. ECNE required. Multi-platform WAN experience preferred; frame relay, Spectrum, Cabletron hubs, and Cisco router a plus. Must be able to work effectively in a highly complex, fast-paced environment.

SR. NOVELL LAN TECHNOLOGIST

Requires 3-5 years experience in the administration of distributed Novell LANs, and background in TCP/IP; Token Ring, IP, multi-protocol stacks, and SNMP skills. CNE required; ECNE preferred. NMS, Spectrum, or Compaq Insight Manager a plus.

DB2 SYSTEMS PROGRAMMER

Requires 5-7 years experience with IBM's DB2 and related components. Strong background with SMP-E and related MVS internals. Experience with IMS DB/DC preferred.

AS/400 TECHNOLOGIST

Requires 3-5 years experience with AS/400s in a distributed environment, and familiarity with AS/400 communications and LAN connectivity issues (SDLC, SNA, Token Ring, Ethernet). Must also be familiar with OS/400 issues and licensed products, CL programming and COBOL, with knowledge of AS/400 hardware and attached devices.

RS/6000 TECHNOLOGIST

Requires 3-5 years experience with UNIX systems including at least 2 years on RS/6000. Familiarity with IBM and other vendor products, backup and recovery procedures and TCP/IP, NFS, DNS and SNA experience, exposure to Xstations, remote printing and scanners are pluses.

In exchange for the expertise, energy and dedication you'll bring to our dynamic team, we offer outstanding compensation, comprehensive benefits including relocation assistance, and performance-based advancement potential. Plus, you'll enjoy the year-round fabulous weather, the array of recreational/cultural options, and the excellent housing and schools found in beautiful South Florida! For consideration, please mail/fax your resume with salary requirements to: **Dept. DC-01, Human Resources, Ryder System, Inc., 3600 N.W. 82nd Ave., Miami, FL 33166. FAX: 305/593-4813.** An EOE. Drug testing is a condition of employment with Ryder.

RYDER

---

decision consultants inc.℠

Pros. Performers. Partners in Excellence.

However we describe them, our people make us great.

We're Decision Consultants, Inc., one of the largest privately held information consulting firms in the country. Our outstanding people make client service their priority — and our continued growth in each of the last 10 years proves the point.

The most satisfying careers are a result of quality, dedication, commitment and integrity.

We are seeking professionals with strong technical expertise and the creative ability to define solutions for our leading edge clients in the following areas:

- C, OS/2, PM
- APL/APL2
- C/C++, WINDOWS SDK
- DMS SWITCHING SOFTWARE EXP
- ORACLE DBA
- VAX/VMS SYSTEM MANAGERS
- SMALLTALK
- UNIX, C/C++, X MOTIF
- STRATUS, VOS, C
- UNIX SYSTEM ADMINISTRATORS
- COBOL II, DB2
- LAN MGR/NT NETWORK ADMIN
- PROTEL
- IMS DB/DC
- C/C++, OS/2, PM, WINDOWS NT, DB2/XDB
- IDMS/ADSO
- ORACLE FINANCIALS DEVELOPMENT
- INFORMIX, SYBASE OR ORACLE
- POWERBUILDER, UNIX, C
- IEF

Exciting projects exist in client/server, telephony and IBM mainframe environments, to name just a few. We offer competitive compensation and exceptional benefits that include tuition reimbursement, 401(k) and 3 weeks vacation. For consideration, send your resume indicating location preference to **National Recruiting-CW, DECISION CONSULTANTS, 5000 Quorum Drive, Suite 410, Dallas, TX 75240. Ph. 1-800-304-4DCI, Fax 214-386-0741. INTERNET: dci@dice.com EOE M/F/D/V.**

• Chicago • Dallas • Detroit • Raleigh • N. California •

DATA PROCESSING
Contract & Permanent Jobs:

- LAN / WAN Networking
- UNIX SYS ADMIN
- UNIX C / C++
- NOVELL ADMIN
- SMALLTALK
- SQL SERVER / ACCESS
- SYBASE / ORACLE
- AS/400 RPG

Fax or send your resume to:
PROTECH SYSTEMS GROUP, INC.
5545 Murray Road, Suite 300
Memphis, TN 38119
800-459-5100
Fax: 901-767-9350

South Carolina

Immediate Openings
Contract or Permanent:

AS/400, Synon
DB2, CICS
Powerbuilder, Visual BASIC
CNE's
CICS, VSAM

SAS, Inc.
PO Box 6048
Greenville, SC 29606
Phone: (803) 297-6079
Fax: (803) 297-9678

AMS Training Services

Technical Trainers

Invest in Yourself, Invest in Us!

If you have a background in application/systems development and/or have demonstrated the ability to learn detailed leading-edge technical topics quickly and thoroughly, please read on.

We are looking for self-starting, organized, highly motivated individuals to teach state-of-the-art training courses. Selected candidates will be provided with the opportunity to develop skills in Object-Oriented and Client/Server technologies.

American Management Systems is one of the nation's leading suppliers of technical training and consulting to Fortune 1000 companies. We provide excellent compensation, benefits, training, and challenges in leading edge technology. Opportunity to travel.

Please send resume to Bill Marut, AMS Training Services, 300 Chapel Rd., Manchester, CT, 06040-9926; FAX (203) 646-8221.



Technology Consulting, Inc. is a dynamic and rapidly growing Software Development Firm with challenging assignments. We are a leader in application outsourcing. Current client projects and our regional development center require the following skills:

CLIENT SERVER – C,C++, Smalltalk, Visual Basic/C++, MS/Access, Oracle, SQL*FORMS, Sybase, Powerbuilder, Windows SDK NT, Foxpro

AS/400 – RPG/400, COBOL

MAINFRAME – COBOL, CICS, IMS DB/DC, DB2, Natural, Construct, INFORMIX, EDI, UNISYS, TIP/DMS, SQL/DS, VM

Arthur Andersen's DCS Package
Senior Banking Managers
Certified Netware Administrator
Cyborg

TCI offers competitive salaries, attractive benefits, and relocation assistance. For consideration, send resume or call: **502-589-3110.**

TCI TECHNOLOGY CONSULTING INC.

1800 Meidinger Tower, Louisville, KY 40202 FAX: 502-589-3107

Healthcare Consulting

ANSWER: Grow, open new paths in health care, stick to its principles.

QUESTION: What's Superior going to do in its NEXT ten years?

1995 offers opportunity to healthcare professionals with hands-on experience in vendor software such as SMS, HBOC, Cerner, Ameritech, FDC and others. Our members work with hospitals, managed care groups, medical offices in the re-structuring of today's healthcare delivery. We install, implement, upgrade; we develop strategic plans; we re-engineer. If your background includes this type of results-oriented, hands-on effort, move your career into high gear.

Talk to our consultants in a confidential information exchange. We'll tell you about travel, advancement, benefits, that no relocation is required. Our first ten years were terrific – the NEXT ten will break all the records. You can be a part of that. Call our recruiters:

Lawrence Cater 810-932-2262 ● **Nancy Guyton** 314-725-1654 ● **Ed Moody** 404-984-9933

OR, write to us:

SUPERIOR CONSULTANT CO., INC.
31731 Northwestern Highway, Suite 250 West
Farmington Hills, MI 48334
810-855-0960

Equal employment opportunity is given regardless of race, color, religion, sex, national origin, ancestry, physical or mental disability, medical condition (including cancer related), marital status, veteran status or age.

SUPERIOR CONSULTANT
HEALTHCARE INFORMATION MANAGEMENT

Exclusive 1995 Career Opportunity for Software Developers

Our client is a very, prestigious consulting company that seeks to challenge the software developer with the "Big 6" image. We are looking for an elite group of software developers with backgrounds in SmallTalk, C++, OO A & D, RDBMS and GUI skills.

- Software Developer with C++ or SmallTalk to research tools such as VisualWorks (ParcPlace), VisualAge (IBM) or Parts (Digitalk).
- Programmer/Analysts at all levels for OO Application and Development in C++, SmallTalk at client sites. Experience with RDBMS's, GUI design and implementation (Visual Basic, Motif) is desired.
- RDBMS technologist with knowledge of Data Mining, warehousing and Oracle.

In addition to having the above skills, the client desires the software developers to have a college degree (the more advanced degree, the better). Of course, an excellent compensation package is available along with a generous benefit package.

For immediate consideration, please send or fax your resume to:

BYA THE HIGH-TECH HIRING SOLUTION

I. Broadman
Bill Young and Associates
8550 Arlington Blvd., Ste. 202
Fairfax, VA 22031
PH: (703) 573-0200
FAX: (703) 573-3612

PROFESSIONALS

Systems Network is a professional services firm specializing in Information Technology and ISO 9000 quality systems. In support of projects for Fortune 1000 clients located in the Southeast, we are searching for contract and full-time professionals who have a minimum of two years' experience in one of the following:

- ✔ **Andersen's DCS/Logistics**
- ✔ **AS/400 Client/Server**
- ✔ **COBOL, CICS, DB2**
- ✔ **HPUX/UNIX System Admin.**
- ✔ **Informix DBA & 4GL**
- ✔ **PowerBuilder**
- ✔ **Sybase DBA**
- ✔ **Windows NT**
- ✔ **UNIX, C/C++**

For immediate consideration, please fax or forward your profile to:

Systems Network
3001 N. Rocky Point Dr. E. #340
Tampa, FL 33607

(800) 676-0812 • Fax: (813) 282-1653



Career Opportunities

LAWSON SOFTWARE is a global leader in client/server business applications software. We design, develop, market and service business applications software for large companies of all industry types. Due to our tremendous growth, numerous career opportunities will be available throughout 1995 in our regional offices and corporate headquarters located in Minneapolis, MN.

REGIONAL POSITIONS

Account Managers

Responsibilities will include providing our clients with software implementation, project management and issue resolution. Ideal candidates will have project management and implementation experience, as well as a strong understanding of implementation methodology and customer satisfaction. Experience using project management tools and exceptional verbal and written communication skills a must. This position requires the ability and flexibility to travel and eight to ten years of related experience.

Consultants

Finance/Human Resources/Materials Management

We are seeking Software Consultants for each of the following: Materials Management, Human Resources and Finance. Responsibilities will include providing end-user classroom training and consulting services utilizing Lawson's products. Requirements include a bachelor's degree in a related field along with public speaking skills. Two to four years computerized business application systems experience on UNIX, AS400 and/or implementation skills an added plus. Excellent communication, interpersonal and problem-solving skills necessary. Overnight travel required.

UNIX Technical Service Consultants

Responsibilities include product installations, technical training and operational usage consulting to our diverse client base. Requirements include at least two to three years UNIX operating system administration experience along with installations and/or implementation background. Excellent communication, interpersonal, verbal and presentation skills essential. Experience with consulting/training a plus. Knowledge of Sybase or Oracle databases preferred. Overnight/out-of-town travel required.

CORPORATE POSITIONS

COBOL Consultants

Main responsibilities include providing technical and application support to our diverse client base, maintenance programming, testing, and documentation. Position requirements include a bachelor's degree or related field experience, plus a minimum 2 years COBOL programming experience. The ideal candidate will have the ability to be a self starter and possess excellent communication, interpersonal and problem solving skills. Experience with distribution systems preferred. UNIX operating system knowledge a plus.

RPG III Consultants

Main responsibilities include client issue resolution from phone consulting through maintenance programming and testing. Additional responsibilities include internal training/mentoring. Position requirements include 1 year RPG III programming experience, including financial applications. Excellent communication and problem solving skills essential.

UNIX Technical Support Consultants

Main responsibility is support of the LAWSON UNIVERSE environmental system to clients and regional service centers. Successful candidate will have 1 to 5 years experience performing development support, or administration in the UNIX open system environment. Experience with COBOL/C, Relational Data Base Systems, Graphical User Interfaces, and Network are added benefits. Excellent communication, presentation/training and problem solving skills a must.

We offer a competitive salary, comprehensive benefits and an opportunity to work in a quality-focused team environment. Please submit resumes (specifying position for which you are applying), and salary requirements to **Lawson Software, 1300 Godward Street, Minneapolis, MN 55413.** Resumes for Regional positions should be to the attention of Services Staffing and Corporate positions to the attention of Corporate Staffing. EOE.

LAWSON *Software*

Atlanta Baltimore/D.C. Boston Chicago
Dallas Los Angeles Minneapolis New York Seattle

Our Vision Spans the Globe

INFORMATION MANAGEMENT & TECHNOLOGY OPPORTUNITIES

The Personal Products Division of Bausch & Lomb, a worldwide leader in eyecare products, is undertaking a significant revamping and migration of its core business systems as well as leading several new applications development efforts. To successfully accomplish this, we are looking for several seasoned professionals with excellent interpersonal skills to join our Information Management & Technology (IM&T) staff.

Bausch & Lomb offers a very competitive salary and benefits package. Qualified candidates should forward their resume, along with salary requirements to:

Bausch & Lomb
Personal Products Human Resources
Department J
1400 N. Goodman Street, PO Box 450
Rochester, NY 14692-0450

BAUSCH & LOMB
Healthcare and Optics Worldwide

Systems Project Manager-Client/Server
In this critical role, you will be responsible for the establishment of our client/server Center of Excellence as well as leading and managing client/server development staff in major application efforts. The successful candidate will have a BS/BA degree in Computer Sciences (an MBA/MS is strongly preferred) and 6-8 years of progressively more responsible IM&T project management experience, at least three of which should have been successfully managing application designers, programmers and business analysts in major applications development efforts.

Systems Project Manager
In this highly visible role, you will lead and manage critical projects and/or development groups and serve as the primary functional contact relating to resource allocation, budget, project timeliness and key deliverables. A BS degree in Computer Science or equivalent is required with an MBA/MS highly desirable. 6-8 years of progressively more responsible IM&T experience is required as is experience supporting applications in Finance, Sales, Marketing and decision support systems.

Applications Development Specialist - AS/400
This position provides AS/400 applications development support including programming and systems specifications development as well as technical support across a wide range of small to large business applications. You will need to possess a BS degree in Computer Science and 3-5 years of applications development using AS/400 technology.

Systems Development Specialist
This job provides application systems development support including design and development, client interface, project timeline management and directing staff and contractors as needed. You must possess a BS degree in Computer Science, 4-6 years of progressively more responsible project involvement/systems analysis work, and some combination of the following environments: AS/400, COBOL, PowerBuilder, SQL-Server or other relational databases.

An Equal Opportunity Employer

CDI Information Services
DIVISION OF CDI CORPORATION

CDI Information Services is a provider of Professional Data Processing personnel. With over 27,000 technical people on assignment, CDI is one of the leading providers of professional services. Current requirements exist for a variety of skills including:

EAST

Available positions include:
PA, VA, KY, WV, MD, Wash., DC

- PowerBuilder
- Oracle, Sybase
- IMS DB/DC DB/2
- GUI, MOTIF
- C, C++, UNIX

Send Resumes to:
14120 Parke Long Court
Suite 204 - CW
Chantilly, VA 22021
Ph.: (703) 222-0700
Fax: (703) 222-7326

SOUTHEAST

Available positions include:
NC, FL, GA

- UNIX, OS/2, C, C++
- SmallTalk
- Oracle, Informix, Sybase
- DB2, Ideal, IMS, COBOL II
- Telephony S/W Development
- UNIX System Administrator
- Network Administrator

Send Resumes to:
S.E. Regional Recruiting - CW
1150 S.E. Maynard Road
Cary, NC 27511
Fax: (919) 467-7653
cdi@salzo.cory.nc.us

MIDWEST

Available positions include:
TX, CO, NE, MO

- UNIX System Administrators
- UNIX Programmers
- AIX, OS/2 Software Engineers
- IMS DB2, COBOL, CICS
- Switching Systems, Cellular and PDAs
- OO-Stuff, C++, SmallTalk

Send Resumes to:
9035 Wadsworth Blvd.
Suite 2700 - CW
Westminster, CO 80021
Ph.: (800) 354-7314
Ph.: (303) 422-6668
Fax: (303) 423-4542
cdi@netcom.com

WEST

Available positions include:
AZ, CA, UT, OR

- IMS DB/DC, DB2, COBOL
- MAC PAC ID
- PowerBuilder
- Windows, GUI, C
- Oracle, SQL, Ingres, Sybase
- COBOL CICS, DB2

Send Resumes to:
2323 W 14th Street
#216 - CW
Tempe, AZ 85281
Ph.: (800) 878-9686
Fax: (602) 968-0811
cdi.corp@romp.com

TANDEM

Immediate openings contract/full time:

COBOL, SCOBOL, PATHWAY
SQL, TAL, C and UNIX

Metro Network Inc.
111 Center St., Suite #1310
Little Rock, AR 72201
Tel 501-372-4500
Fax 501-377-2437

CONSULTANTS

$60,000 TO $175,000

We have requirements for the following skills:

- **IEF (BAA, BSI, Infrastructure)**
- **Object Oriented (OOA, OOD, OOP)**
- **ORACLE CASE**
- **SAP R/2, R/3, ABAP/4.**
- **Methodologists (OO, IE, AI)**
- **PC Help Desk Support**

Please call or send resume to:
LOGAN/BRITTON
3300 S. Gessner, Suite 203
Houston, Texas 77063

1-800-362-4352 • Fax (713) 266-0263

Brand-New Opportunity

Under the Bright Florida Sun

Nielsen Media Research, the leader in the TV ratings industry and a dynamic division of a Fortune 500 Corporation, relies on innovative technology to provide complex audience measurement data. Continued growth has created new opportunities at our Florida headquarters. All these positions require a degree in Computer Science or equivalent work experience.

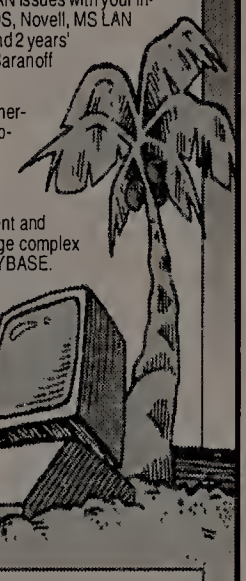
SR. PROGRAMMER/ANALYST – 5+ years' experience with C and C++, proficiency in SYBASE relational DBMSs (SOL, triggers, stored procedures), object oriented methodologies and UNIX, plus the ability to work on a RAD development team in an MS Windows environment.

LEAD SOFTWARE QA ANALYST – Three years experience as a QA Analyst with at least one year in a Client/Server environment. The Client/Server experience must be in a GUI (PowerBuilder preferred), RDBMS (Sybase preferred), UNIX, and C environment using test tools (Mercury Interactive preferred) and version control packages, such as PVCS or SCCS.

MS MAIL SPECIALIST – Provide technical solutions to highly complex LAN issues with your in-depth knowledge of MS Mail client, remote and server software, MS Windows, DOS, Novell, MS LAN Manager and Windows NT. 4 years' experience in LAN or E-Mail administration, and 2 years' as an MS Mail Administrator are required. Knowledge of SMTP Gateways, UNIX, Baranoff Mail Check, SNMP, TCP/IP, and LAN management tools is desirable.

APPLICATION TECH. SPECIALIST – 5-8 years' experience in commercial software Windows development using C/C++ and 2 year's hands-on development using PowerBuilder. 3-5 years' experience leading technical systems design on complex, full life cycle Windows applications (multi-platform, relational database preferred), Visual Basic, Excel Macro development and OLE.

DATABASE ADMINISTRATOR – We'll rely on you to design, implement and tune physical databases. 5-10 years' experience in software development of large complex applications, 3-5 years' of relational database administration, and 1 year using SYBASE. Familiarity with Open Client/Server, Replication Server, C coding and Solaris is desirable.



We provide an excellent relocation package plus an attractive salary and benefits. Send your resume indicating position of interest to: **NIELSEN MEDIA RESEARCH, Human Resources Dept. CW/0102, 375 Patricia Ave., Dunedin, FL 34698. FAX: (813) 738-3012.** An Equal Opportunity Employer M/F/D/V.

People...Quality...Results

Nielsen Media Research

a company of The Dun & Bradstreet Corporation

data processing

EXCEEDING EXPECTATIONS

PROGRAMMER ANALYST

Your skills can shape an industry

Third party logistics is a business whose growth potential is just beginning to be realized. Schneider Logistics, the acknowledged leader in the logistics arena, offers the opportunity to shape the booming transportation industry well into the 21st century. You will play a key role in developing business applications for our constantly expanding customer base.

In addition to a Bachelor's degree in Management, IS, CS, Math or Business, you must have at least 2-5 years information systems experience and technical skills including:

- UNIX operating system
- 4 GL application development language (eg. Uniface, Oracle or Power Builder)
- Sybase or comparable Relational Database
- Knowledge of Windows program (MS, SQL or X)
- Experience with C, C++, EDI or main frame application development is a plus

We offer a very competitive compensation package and many opportunities for professional development. For consideration, please send resume with salary history to: Schneider National, Human Resources - ADA - 12CW-WH, PO Box 2545, Green Bay, WI 54306-2545. No phone calls or agencies please.

Equal Opportunity Employer M/F/D/V

SCHNEIDER LOGISTICS

SOFTWARE ENGINEER: (2 positions) 40 hrs/wk. 8 a.m. - 5 p.m., $51,000./yr. Analyze, design and develop computer software application systems on IBM 30xx mainframes utilizing CICS, DB2, CSP/AD and REXX. Develop utilities and write exit routines. Requires Bachelor's Degree in Computer Science or Mathematics. Reqr. 4 yr. expr. in job offered or 4 yrs. expr. as Systems Analyst/Programmer/Consultant/Engineer. Reqr. work expr. in development of s/w systems on IBM 3090 utilizing CICS, DB2, CSP and REXX. "Employer paid ad." E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. No: 15095.

CONSULTANTS

- Nationwide Opportunities
- Long & Short-term
- NATURAL/ADABAS, CONSTRUCT, POWERBUILDER

Send resume to: **CPL WorldGroup, 2185 N. California Blvd., Suite 265, Walnut Creek, CA 94596. FAX: (510) 472-4904.**

CPL WORLDGROUP

SON Systems
is developing a nationwide network of consultants in:
Cognos/Powerhouse
If you have experience using Cognos products
Contact: Scott Detwiler
(610) 525-8210
Fax (610) 525-0230
14 Bryn Mawr Avenue
Bryn Mawr, PA 19010

PA - OHIO - WV

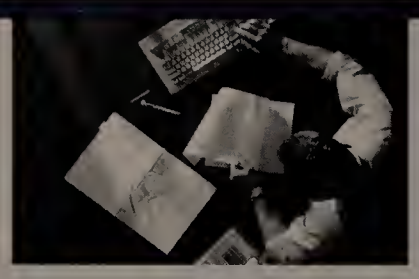
Consulting and full time Project Manager, P/A and DBA roles immediately available in:

Retail POS, DB2/CSP, Inventory Control, Visual Basic, Warehousing, Powerbuilder, Store Operations, Oracle/Sybase, Order Entry, Natural/Adabas, Self Service, MS Access & C/C++, EDI, Gentran/Cobol, Networking, Windows NT, R&D, Macintosh/C, Customer Info, Cobol/CICS/IMS, Human Resources, Peoplesoft, Client Server, Gupta, SQL Server

Reply with a cover letter and resume to:
A.C. Cy Company
PO Box 1262
Canonsburg PA 15317
412-941-2220 • FAX 412-942-9140

SOFTWARE ENGINEER: (2 positions) 40 hrs/wk. 8 a.m. - 5 p.m., $44,500./yr. Analyze, design, develop, code and test computer software application systems on a TANDEM platform utilizing GUARDIAN O/S, NON-STOP SQL, PATHWAY and TAL. Perform database administration as well as performance tuning. Requires Bachelor's Degree in Computer Science or Electrical Engineering. Reqr. 3 yrs. expr. in job offered or 3 yrs. expr. as Systems Analyst/Programmer/Manager/Executive. Reqr. work expr. in design and development of s/w systems on TANDEM platform utilizing GUARDIAN O/S, NON-STOP SQL, PATHWAY and TAL. "Employer paid ad." E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. No: 13495.

SOFTWARE ENGINEER: (2 positions) 40 hrs./wk., 8am-5pm., $42,000/yr. Design and develop s/w systems for manufacturing applications on IBM 3090 and UNIX mainframes utilizing MVS, COBOL, CICS, DB2, CSP, IEF and ORACLE software. Gather user requirements, prepare external and internal design and test data. Require Bachelor's degree in Computer Science, Electrical or Mechanical Engineering & 3 yrs. expr. in job offered or 3 yrs. expr. as Programmer/Analyst. Work experience in developing s/w systems on IBM 3090 and UNIX systems utilizing MVS, COBOL, CICS, DB2, CSP, IEF and ORACLE. "Employer paid ad". E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. No: 12795.



How the best get recognized.

They work at CIBER. We've just been recognized by FORBES MAGAZINE as one of the best 200 small companies in America because of our explosive growth. A growth rate of 28% over the last 5 years. This growth has also led to over 1,000 current openings for I/S consultants, more chances to work with the most current technologies in a variety of industries, and more Fortune 1,000 clients.

You can get recognized as one of the best, by working for one of the best–by working for CIBER. You'll also receive comprehensive benefits including major medical, life and disability insurance, stock plan and relocation assistance—if you have one or more of the following skill sets:

Progress	Oracle 6.0, 7.0	IMS DB/DC
Windows/NT	C++/OS2	Powerbuilder
Lotus Notes	C/C++	DB2/CICS
Visual Basic	Sybase	AS/400
SmallTalk	System Admin.	Peoplesoft
Informix	Data Modelers	Oracle Financials
Crystal Report Writer		DBAs

We have opportunities in these cities and more:

Atlanta	Buffalo	Cedar Rapids	Charlotte
Cleveland	Colorado Springs	Dallas	Denver
Des Moines	Detroit	Houston	Kansas City
Melbourne	Minneapolis	New Jersey	Omaha
Orlando	Phoenix	Pittsburgh	Reston
Rochester	Sacramento	Seattle	Tampa

Call us today. Or send your resume to:
CIBER National Recruiting, Dept. CW12, 4100 E. Mississippi Ave., Suite #1700, Denver, CO 80222, Phone: 1-800-669-0401, FAX: 1-303-782-4782. Equal Opportunity Employer.

CIBER
AN ETHIC OF EXCELLENCE

CBSI is seeking programmer analysts to work at client sites on the latest in computer technology. To qualify, candidates must have one year of experience, a willingness to learn and be open to relocation.

CBSI is an international computer consulting firm specializing in systems integration, software application development, programming and business process re-engineering. Our reputation for delivering on-time, cost effective solutions has enabled CBSI to grow from a handful of employees in 1985 to an international company with over 1,000 employees in 12 offices and many project sites worldwide. CBSI is on the preferred vendor list for many different corporations and is ranked as one of the fastest growing private companies in Michigan and the U.S.

We are looking for candidates in the following areas:

Database
DB2
IMS
Sybase
ORACLE 7.0

Client/Server
PowerBuilder

4GL
Synon
CSP

CASE Tools
ADW/IEW
IEF

Operating Systems
UNIX
OS/2

Other Skills
Visual Basic, C++
Cobol, CICS
TELON, APPS

CBSI COMPLETE BUSINESS SOLUTIONS, INC.

CBSI is an equal opportunity employer offering a competitive salary and complete benefit package. Please send/fax resume to:

CIA MCCAFFREY, P.O. BOX 2248
FARMINGTON HILLS, MI 48333-2248
FAX: (810) 488-2089

Force 5 Inc.

NATIONWIDE PROJECTS

- VAX/COBOL/RDB/ACMS/DECFORMS P/A's
- IMS/ASSEMBLER P/A's
- ACP/TPF PROGRAMMERS
- HP/UNIX/C/EMBEDDED SQL/ORACLE V.7 P/A
- IEF - JR. and SR. CONSULTANTS
  - TECHNOLOGY SPECIALISTS
  - PROJECT MANAGERS
- POWERBUILDER DEVELOPERS (ORACLE/SYBASE)
- PC EXPERTS (XENIX/DOS/C/BASIC/B-TRIEVE)
- LOTUS NOTES DEVELOPERS
- VISUAL BASIC/C++/WINDOWS NT P/A's
- AS/400 RPG 400/COBOL PROGRAMMERS
- DBA's ORACLE/SYBASE/RDB
- EDI SPECIALISTS (AS/400, GENTRAN)
- IBM/DB2/COBOL/CICS P/A's
- LBMS DEVELOPERS (VAX ENVIRONMENTS)

ATTN: Recruitment Staff
5055 Keller Springs Rd.
Suite 550, Dallas, TX 75248
Phone (214) 248-8555 • Fax (214) 248-8205
Compuserve 75151,507

Looking for qualified computer professionals?

Look no further. More than over one half million computer professionals read *Computerworld* every week. And you can reach all of them -- or just the ones in your region --with a regional or national recruitment advertisement in *Computerworld's Computer Careers* section.

For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700); or call your local sales office listed below:

BOSTON
Nancy Percival
375 Cochituate Road, Box 9171,
Framingham, MA 01701-9171, 508-879-0700

NEW YORK
Marty Finn
Mack Center 1, 365 West Passaic St.,
Rochelle Park, NJ 07662, 201-587-0090

WASHINGTON, D.C.
Katie Kress
8304 Professional Hill Drive,
Fairfax, VA 22031, 703-573-4115

CHICAGO
Patricia Powers
1011 E Touhy, Suite 550,
Des Plaines, IL 60018, 708-827-4433

LOS ANGELES
Barbara Murphy
2171 Campus Drive, Suite 100,
Irvine, CA, 92715, 714-250-0164

EXPANDING YOUR OPPORTUNITIES

SOFTWORKS, a rapidly growing provider of software products, offers opportunities for aggressive career growth. Our dynamic work environment provides creative Information Technology professionals with the ability to turn their ideas into leading edge products. SOFTWORKS offers a casual work environment , and a compensation package that includes competitive salaries, excellent benefits, and bonuses incentives.

Windows & Netware Developers
Developers are needed for workstation/server and communications software development, experience using WINDOWS, WINDOWS/NT, Visual C++, or OS/2 is required. CNE or ECNE is a plus for the Netware developers.

DB2 Software Development
DB2 Senior Software Developers needed for data base and systems administration products. Strong C/C++ experience with a minimum of 4 years software development. In-depth knowledge of DB2 catalog structures, utilities, DDF, DDCS/2 and SQL, as well as, DB2 DBA skills in a large production environment desired. Visual C++, Windows SDK, network/communication (APPC-TCP/IP) and any other relational data base systems a plus.

DB2 - SYBASE - ORACLE
Experienced DB2, SYBASE, ORACLE Database Administrators needed to implement, administer and support product development and production environments. Must have at least 4 years experience in any of the RDMBS listed in a large production environment. Experience must consist of both application and system administration support. Strong knowledge of software testing methodologies is required.

SYBASE Software Development
SYBASE Senior Software Developers for the development of database and system administration products. Strong C/C++ experience with a minimum of 4 years software development. Extensive knowledge of SYBASE 4.9.X/SYSTEM 10, in-depth knowledge of SYBASE catalog structures, OMNI SQL, and Transact-SQL are desired. Ideal candidate would possess both UNIX and/or WINDOWS/NT system administration skills. Strong DBA skills, knowledge of SYBASE database utilities (DBCC) and API's(CTlib, DBlib, OpenClient) are preferred.

MVS Systems Software Developers
Developers with experience in Assembler, CICS, DFSMS, DFHSM, ADSM, IMS, DB2, and RACF.

Professional Services Consultants
Disaster Recovery Professionals with a Minimum of 5 years experience. We are also accepting resumes of consultants with DFSMS, DFHSM, DB2, ADSM, and Communications experience.

For confidential consideration mail or fax your resume to SOFTWORKS attn.: Human Resources/ CWAD12

Suite 400, 5845 Richmond Highway Alexandria, VA. 22303
FAX: 703-317-3228
Equal Opportunity Employer

INFORMATION SYSTEMS PROFESSIONALS

At C. W. Costello & Associates you can become a vital player on a team that has established itself as a major force in the I. S. consulting industry.

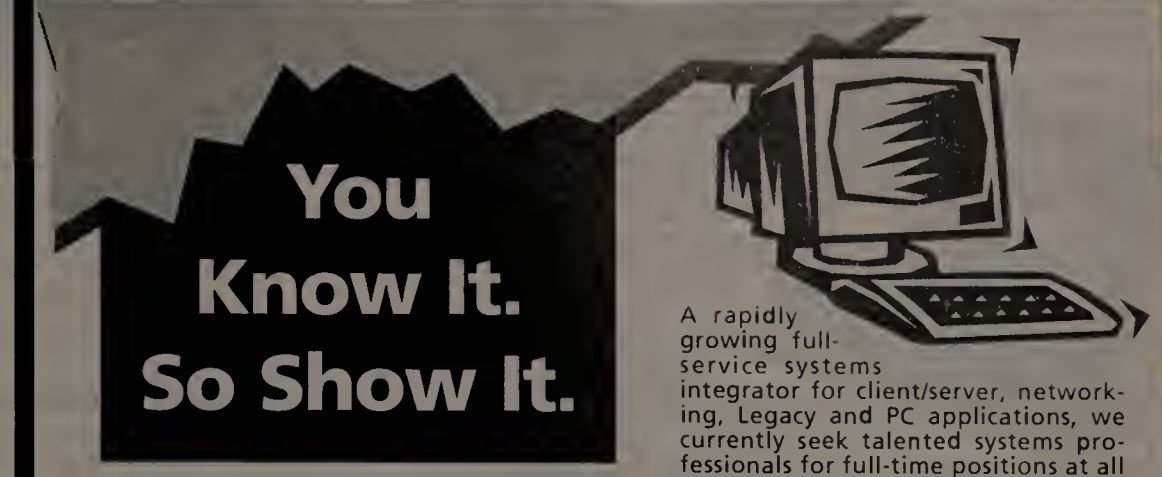
If you stand out from the crowd, we want to discuss our current employment opportunities with you. Our requirements include a college degree with a minimum of two years development experience utilizing any of the following skills: DB2, CICS, ORACLE, COBOL, MicroFocus, CASE Tools, IMS DB/DC, TELON , PACBASE, VISUAL BASIC, C++, POWERBUILDER and a variety of other Client/Server environments .

At C. W. Costello, you'll enjoy an excellent salary and generous benefits including profit sharing, bonuses, paid overtime, 401k pension plan, professional education, and also have the opportunity to contribute to the operations of the firm and to put yourself on a path to equity ownership in the company.
Please fax or send your resume to...

C.W. Costello & Associates, Inc
172 East State Street, Suite 310
Columbus, OH 43215
614-464-3360 Voice 614-464-3390 Fax
Equal Opportunity Employer

C.W. Costello & Associates Inc. — Management · Information · Systems

Boston Chicago Columbus Hartford Minneapolis Tampa



You Know It. So Show It.

Show your systems savvy and business smarts with Pittsburgh Business Consultants, Inc.

Pittsburgh
Atlanta
Cedar Rapids
Dallas
Denver
San Diego
Washington, DC

A rapidly growing full-service systems integrator for client/server, networking, Legacy and PC applications, we currently seek talented systems professionals for full-time positions at all of our U.S. locations. Skillsets in demand include:

- UNIX • C/C++ • RDBMS
- OS Presentation Manager • SAP
- Mainframe Software • RS/6000

Management Consulting Solutions, our multimillion dollar division providing consulting services for the healthcare industry, offers opportunities to individuals with experience in:

- Networking • SMS • MediPac/HBO

If you are creative, solutions-oriented and ambitious, we'd like to talk. Tell us where you want to be. We'll tell you where we're going–and how you can reach your goals with us. Call 1-800-722-9820 today or fax your resume to 412-391-0478.

PITTSBURGH BUSINESS CONSULTANTS, INC.
Contract Programming · Consulting · Placement

EOE

Inc. 500
1994
1993
1992

To Advance Your Career, Join Our Winning IT Consulting Firm.

The Registry, Inc., a leading IT consulting firm, is one of a select few organizations to be honored as a three-time Inc. 500 company. We appreciate that our rapid growth and success is attributable to the success of our best-in-class consultants. That's why we offer our consultants unparalleled opportunities, through our:

- **Technology Sector Recruiting**
  Enables our specialized recruiters to fully understand consultant skills and capabilities.
- **Delivery Management System**
  Matches consultant expertise and professional goals with the best local and nationwide opportunities.
- **Flexible Career Options**
  Provides hourly and salaried positions both short- and long-term.
- **Consultant Retention Program**
  Builds long-term relationships through successive project placements.

We have opportunities from: coast to coast.

Call for a National recruiter, and get on-board projects in the following technologies:

Oracle, Sybase DBAs
ask for Leora Dryer (ldryer@tri.com)

IMS DB/DC, DB2, CICS, COBOL II
ask for Sean Dowling (sdowling@tri.com)

Unix Streams, TLIs, SVR4, Windows NT, OS/2 PM, drivers
ask for John Byrne (jbyrne@tri.com)

Vax Systems Managers, Pathworks, ACMS, DECForms
ask for Sandy Kontos (skontos@tri.com)

Telecomms Switching, AIN, SNMP, CMIP/CMOT, SONET/SDH, X.25
ask for John Byrne (jbyrne@tri.com)

Unix Sys. Admins. (HP-UX, Solaris, RS6000)
ask for Sandy Kontos (skontos@tri.com)

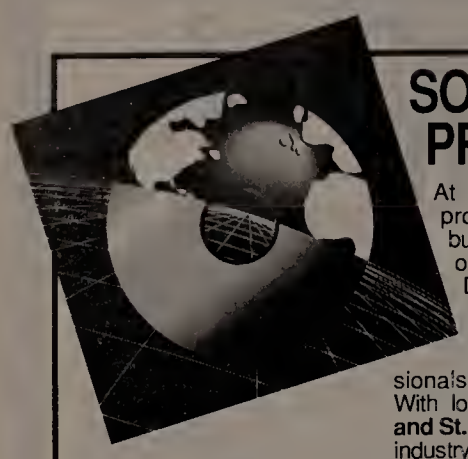
In addition to excellent compensation, we provide a 401(k) plan and healthcare options. **Please e-mail, fax or call with your selected opportunity and location:**

1-800-248-9119 • Fax: 617-527-8805

The Registry, Inc.
Attn: National Division, 189 Wells Avenue, Suite C, Newton, MA 02159

Member NACCB ®

Atlanta, GA	Dallas, TX	McLean, VA	Rosemont, IL
Boston, MA	Denver, CO	Newton, MA	San Francisco, CA
Charlotte, NC	Durham, NC (RTP)	New York, NY	Seattle, WA
Chicago, IL	Ft. Lauderdale, FL	Rye Brook, NY	Schaumburg, IL
Cleveland, OH	Greensboro, NC	Richmond, VA	Stratham, NH
Columbus, OH			



SOFTWARE PROFESSIONALS

At Daugherty Systems, our focus is providing total business solutions. We build, re-engineer, maintain and enhance our clients' most critical software needs. Daugherty's reputation for providing customer service and software methodologies coupled with providing high caliber, career oriented professionals has generated 90% repeat business. With locations in **Atlanta, Chicago, Dallas and St. Louis,** Daugherty Systems has led the industry in business solutions for 10 years.

Join a Company Whose Vision Extends Into The Next Century

To become a part of this solutions-oriented partnership, you must possess a Bachelor's degree in Computer Science with 2 years commercial experience. Strong leadership skills and the desire to achieve a higher level of excellence are essential.

We are currently seeking Software Development Professionals with experience in the following:

- POWERBUILDER
- WINDOWS NT
- SQL/WINDOWS
- UNIX
- SYBASE
- C/C++
- INFORMIX
- VISUAL BASIC
- VISUAL C++
- VAX RDMS

If your qualifications match our needs, we encourage you to look into a future with Daugherty Systems. We possess relationships with Powersoft, Microsoft, Gupta, Oracle and Informix, and we encourage continuous training and certification. If interested, forward your resume in confidence to: **Daugherty Systems, One CityPlace Drive, Suite 240, St. Louis, MO 63141; 1-800-737-8200, FAX (314) 432-8217; Attn: C. Donovan, Dept. CW0195.**

DAUGHERTY SYSTEMS™
SOFTWARE & SYSTEMS SOLUTIONS
An Equal Opportunity Employer

AUSTRALIA U.K EUROPE
USA NEW ZEALAND

CCI- your Passport to the world

SYNON IEF IMS Telon SAP
TPF NOMAD DB2 CICS COBOL
ORACLE 6/7 & Financials HOGAN
TANDEM Base 24 LANSA AS/400
VISUAL BASIC PRO IV LOTUS NOTES
POWERBUILDER SYBASE UNIX C
IDMS/R UNISYS LINC & NAP

COMPUTER CONSULTANTS INTERNATIONAL
sanfrancisco - dallas - atlanta -melbourne - sydney
canberra - wellington - london

West Coast Call Narelle Smith **415 461 8989 fx 4601**
East Coast Call Wendy Hood **404 565 1255 fx 1353**
Mid West Call Helene Goldberg **214 783 0454 fx 1161**

CLIENT/SERVER ANALYST

The fastest growing retailer in the country seeks an aggressive career minded professional to join our team.Successful candidate should possess at least 6 months experience in any of the following areas:

- Powerbuilder
- Client/Server
- Graphical User Interface
- C++
- Relational Database (Oracle Preferred)

We offer an excellent benefit package!

To be considered please send resume to:

Dollar General Corporation
Attn: Client/Server
104 Woodmont Blvd., Suite 500
Nashville, TN 37205
or Fax to: 615-783-2051

Conference Call

1995 CORPORATE TECHNICAL RECRUITING CONFERENCE



Computerworld's Corporate Technical Recruiting Conference
Suburban Denver, Colorado
June 11-14, 1995
For more information, call 1-800-488-9204

*Clip and FAX this coupon to **1-508-620-9430** or call **1-800-488-9204** for more information.*

Please place my name on your mailing list so I'll receive registration materials and information throughout the year.

Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip Code _____
Phone _____
Fax _____
e-mail _____

CTRC

VIPS

A NATIONALLY recognized software development firm for the HEALTHCARE industry.VIPS is experiencing unparalleled success in our healthcare product lines,and we need to expand our DEVELOPMENT team in multiple areas.

VIPS HAS AN IMMEDIATE POSITION TO FILL -

PRODUCT DEVELOPMENT MANAGER

This proven candidate will lead the planning,design and implementation of a new product line for 1995.All development will be in a CLIENT SERVER arena.If you have a proven track record for developing products for the external market please let us hear from you!!!!

VIPS has other opportunities at all levels in our CLIENT SERVER arena - management, development,analysis and programming!!!! VIPS develops in UNIX,WINDOWS,WINDOWS 95 and WINDOWS NT. ORACLE and SYBASE are the RDBMS tools.(2 years minimum business experience in one or more of the following areas.)

Opportunities Include:

- DBA - ORACLE and/or SYBASE
- Senior Systems Analysts - healthcare knowledge a strong plus
- VISUAL BASIC Specialists
- C/C++ Developers
- NOVELL
- Sales Representatives

Please forward your resume with salary requirements and cover letter to:

VIPS
One W. Pennsylvania Ave, 7th Floor
Towson, MD 21204, ATTN: CW/JOHNSON
FAX: 410-832-8321

VIPS offers career growth,competitive benefits & in-depth training.EOE

Don't Waste Time to Expand Your Horizons, CONTACT VIPS TODAY!!!

TANDEM PROFESSIONALS

CISCORP, a national systems integration firm and a preferred services provider to Tandem Computers Inc. is seeking experienced Tandem Professionals for the following requirements:

COBOL, SCOBOL, C, TAL, SQL, TELCO, CLIENT-SERVER, UNIX, BASE 24

CISCORP provides excellent benefits to our employees including an Employee Stock Ownership Plan. For confidential consideration, please mail resume to:

Rob Dougherty-MS dept# 0839
Penn Center West II, Suite 430
Pittsburgh, PA 15276
800/969-0099 or fax 412/787-3070

CIScorp

Equal Opportunity Employer

Library Network Coordinator

Raymond H. Fogler Library at the University of Maine seeks a Library Network Coordinator to manage planning, installation, training, and operational support for computer hardware, software and networks. Responsible for stand-alone and networked CD-ROM systems, GIS workstation(s), outreach services, office automation, and providing training in new technologies. Required: B.S./B.A. in Computer Science, M.I.S., Electrical Engineering, or closely related technical field. Knowledge of UNIX, DOS and Mac platforms, including hardware and software, with demonstrated systems administration experience. Broad knowledge of telecommunications hardware and software in a multi-protocol environment: TCP/IP, IPX, SPX and Appletalk data streams. Knowledge of Novell 3.1. Ability to create DOS batch files & program in C and shell. Twelve month appointment with 20 working days annual leave, TIAA/CREF, life and health insurance. Salary commensurate with experience. Send cover letter, resume, and names of 3 references to: **Elaine M. Albright, Chair, Library Network Coordinator Search Committee, University of Maine, 5729 Fogler Library, Orono, ME 04469-5729. (FAX: 207-581-1653)** The University of Maine is an affirmative action/equal opportunity employer.

JMRoss & Associates, Inc. is a St. Louis-based *woman-owned professional services* firm. Data processing & Engineering Contract & Permanent (Current openings listed on all major BBS or call our internal hot line at ext.450.)

JMR Associates, Inc.
9417 Lackland Rd.
Overland, MO 63114
(314)429-ROSS
FAX 429-7600

★ GET OUT ★ OF TOWN
NATIONWIDE
OPPORTUNITIES

YOUR HOME TOWN MAY HAVE MANY JOBS, BUT NOT YOUR CAREER OPPORTUNITY. THE COMPUTER-TECH NETWORK OF 160 NATIONAL COMPUTER SEARCH AGENCIES SPECIALIZES IN THE NO CHARGE PLACEMENT AND EMPLOYER PAID RELOCATION OF COMPUTER PERSONNEL TO ALL AREAS OF THE U.S.A. & OVERSEAS.
TOLL FREE 1-800-752-3674
FAX (216) 356-9991

COMPUTER TECH NETWORK

21010 Center Ridge Rd.
Rocky River, Ohio 44116

"Best Technology." "Easy To Use."

We don't believe in tradeoffs.

That's probably why in a recent Brand Preference Survey, ***Computerworld*** readers chose Micro Focus COBOL Workbench as the top finisher in the Best Technology and Easy to Use categories. At Micro Focus, we create business application development environments that meet the most stringent technical challenges without sacrificing usability.

It takes special people to turn technology into solutions. **If you're technically savvy and customer driven, with excellent communication, presentation and problem-solving skills, consider the following opportunities.**

☐ Sales Support Representatives

Palo Alto and Los Angeles, CA; New York, NY; and King of Prussia, PA

You will support all technical aspects of the selling cycle, from pre-sales and demos through installation and account management of Micro Focus products on DOS, OS/2, Windows and UNIX®-based platforms. Qualifications include 5+ years of application development experience under COBOL, CICS and IMS, as well as a working knowledge of client-server concepts, applications and codes. Experience with UNIX, LANs or Micro Focus products preferred. The ability to travel within a geographical area is essential.

☐ Product Support Representatives

King of Prussia, PA

As a member of the Micro Focus support team, you will provide the highest level of technical support to our corporate customers. Qualified candidates have a BS or equivalent and a minimum of 5 years of programming experience, including one of the following skill sets:

- Data communication skills, including VTAM/SNA
- CICS/DB2 and Oracle, Sybase, Ingres or Informix
- 370 Assembly language and macros

Micro Focus offers an attractive salary and bonus plan, along with outstanding benefits, including stock options, profit sharing and a 401(k) plan. For immediate consideration, please send your resume, indicating position/location of interest, to: Micro Focus, Attn: Professional Staffing, 2465 East Bayshore Rd., Palo Alto, CA 94303. FAX: 415-496-7248. Internet: dkm@mfltd.co.uk EOE M/F/D/V. Principals only. UNIX is a registered trademark of UNIX System Laboratories.

MICRO FOCUS

CONSULTANTS

There is high demand for your skills and expertise among companies in the Information Technology Industry. You want to make the right career move, yet sometimes it's hard to sort out the hype from reality.

LISTEN to what some of METRO's 1,000 Staff Members said about their Company on a Company-wide Staff Survey conducted last fall. Then, call the Professional Staff Recruiter in the location of your choice to discuss your opportunities.

WHAT IS THE MOST POSITIVE ASPECT OF METRO?

"Great Company. Very supportive and people-oriented. The Staff is the best. Not just good, but extremely good."

"Working with other Consultants who have a professional approach to their work and take pride in doing the job right."

"Opportunity for personal and professional growth and financial gain. Metro provides a unique combination of responsibility and freedom."

"Being part of a fast growing, dependable Company."

"The ability to further my education and use the skills acquired."

"The benefits package is excellent."

If you are interested in multiple locations or are qualified for a number of opportunities:

Call Kim 800-486-8406 (Ext. 136)
Fax 804-486-0816 (Dept. 195A)
EOE

METRO
Information Services

CICS, DB2, IDMS, IMS DB/DC, APS
Atlanta, Charlotte, Dallas, Ft. Lauderdale, Greensboro, Houston, Jackonsville, Nashville, Raleigh, Richmond, Roanoke, San Juan, Tampa, Virginia Beach

C++, OS/2, MS-Windows or Windows/NT
Atlanta, Charlotte, Dallas, Houston, Jacksonville, Raleigh, Tampa

Visual Basic, Visual C++
Atlanta, Ft. Lauderdale, Nashville, Raleigh, Virginia Beach

C, UNIX, Oracle, SQL
Atlanta, Dallas, Ft. Lauderdale, Greensboro, Houston, Jacksonville, Nashville, Raleigh, Richmond, Tampa Bay

Oracle, DBA/SQL*Forms/4-D
Atlanta, Raleigh, Richmond

Peoplesoft
Atlanta, Greensboro, Nashville, Raleigh, Richmond

PowerBuilder, Sybase, SQL Server/NT
Atlanta, Dallas, Ft. Lauderdale, Greensboro, Houston, Nashville, Raleigh, Richmond, Virginia Beach, Winston-Salem

ADABAS / NATURAL
Atlanta, Greensboro, Richmond, Winston-Salem

Microfocus COBOL, APS/PC
Charlotte, Richmond

SAP/ABAP
Greensboro, Houston, Nashville, Richmond, Virginia Beach

FoxPro, Clipper
Nashville, Raleigh, Richmond, San Juan, Virginia Beach

Smalltalk
Dallas, Ft. Lauderdale, Greensboro, Raleigh, Roanoke

Special Requirements

HP-3000, SATCOM BOSS (Richmond)
Banking - Business Analysts and Mainframe Programmers (Atlanta, Charlotte, Dallas)
Tesseract (Richmond)
Sun UNIX (OS/2 and Solaris) LAN Administrators (Dallas, Raleigh)
Windows NT/AS Systems Engineers (Dallas)
C, UNIX, AIX Systems Administrators (Atlanta, Dallas, Richmond)
M & D, Millennium (Atlanta)
SGML/HTML Developers (Virginia Beach)
Enfin (Winston-Salem, Virginia Beach)

Atlanta,GA	800-486-5302	Nashville, TN	800-486-5308
Fax	*404-843-5930*	*Fax*	*615-373-6904*
Charlotte, NC	800-486-5291	Orlando, FL	800-486-5286
Fax	*704-529-6116*	*Fax*	*813-286-1011*
Dallas/Ft. Worth, TX	800-486-5287	Raleigh, NC	800-486-5289
Fax	*214-490-4681*	*Fax*	919-783-9305
Ft. Lauderdale, FL	800-486-5305	Richmond, VA	800-486-5290
Fax	*305-476-9729*	*Fax*	*804-285-7895*
Greensboro, NC	800-486-5294	Roanoke, VA	800-486-5294
Fax	*910-665-1844*	*Fax*	*910-665-1844*
Greenville, SC	800-486-5291	San Juan, PR	800-486-5305
Fax	*803-297-6799*	*Fax*	*809-756-8967*
Houston, TX	800-486-5063	Tampa, FL	800-486-5286
Fax	*713-871-8962*	*Fax*	*813-286-1011*
Jacksonville, FL	800-823-1319	Virginia Beach, VA	800-486-5283
Fax	*904-281-1040*	*Fax*	*804-431-8215*
Miami, FL	800-486-5305	Winston-Salem, NC	800-486-5294
Fax	*904-281-1040*	*Fax*	*910-665-1844*

Innovation has long been a part of Welch's historical success. Without it, we wouldn't be the leader that we are today. We're continually exploring new ideas, making progress a reality. Add to our innovation and become a part of history in the making.

PROGRAMMER ANALYST/ EDI SPECIALIST

Qualified candidates will possess a degree in computer science or related field and have 3 years solid experience in an AS/400 RPG environment designing, coding, testing and installing applications software. Experience with EDI applications is essential. Preference will be given to individuals with application development experience in the sales and customer order management areas.

We offer excellent salary and benefits, including 401(k). Please send your resume and confidential salary information to:

Welch's, 3 Concord Farms
555 Virginia Rd., Concord, MA 01742.
Attn: Human Resources - PAE

An Equal Opportunity Employer

ATTENTION PROGRAMMERS!

MBI, Inc., a leader in the direct marketing industry located in Fairfield County, Connecticut, seeks experienced DP professionals:

- **AS/400 RPG** Programmer Analyst
- Programmer Analyst with **PL/1** or **COBOL** in an **IBM OS/MVS** environment. **CICS** and supervisory experience is a plus.
- **PC LAN** specialist

MBI offers a competitive salary and benefits package, including bonus, profit-sharing and 401(k) plans.

Submit your resumé and **salary history** to:

MBI
MBI, Inc.
Personnel Manager
47 Richards Avenue
Norwalk, CT 06857

QUALITECH Systems, Inc.

Experiencing unprecedented growth, we are creating exciting career opportunities in our sunny Florida headquarters and our new metro NYC office. We offer long-term employment with a full range of benefits.

Immediate openings for:

* Florida Marketing Rep
* Programmers and DBAs with the following:

- **DB2** • **CICS** • **IMS**
- **Unix** • **Windows** • **C**
- **Oracle** • **Sybase** • **SAS**
- **OS/2** • **Informix**
- **SAP, R2, R3** • **Smalltalk**
- **PowerBuilder**

Call, fax, or mail resume to:

9250 Baymeadows Road
Suite 120
Jacksonville, FL 32256
PH 800-831-8324
FX 904-737-9806 or

355 Madison Avenue
2nd Floor
Morristown, NJ 07960
PH 800-993-1220
FX 201-993-1239

Analyst/Programmer

Cited by INC magazine as one of the top 300 fastest growing private companies, we are offering a challenging opportunity with this national health service company as an Analyst/Programmer.

Qualified applicants will have experience designing and implementing applications using Progress 4GL language preferably in an AS/400 environment. The successful candidate will have excellent business and communication skills and be able to demonstrate ability for teamwork. A college degree is helpful.

In addition to a competitive salary, we offer participation in our health and dental plans, provide short term and long term disability insurance, group life, a 401(k) plan, tuition reimbursement, a non-contributory pension plan and more.

Only qualified candidates should submit their resume personally to:

RAYTEL℠

Human Resources, Dept. I
Raytel Medical Corporation
7 Waterside Crossing, PO Box 727
Windsor, CT 06095-0727
EOE m/f

East

PALARCO INC.

SYSTEMS CONSULTANTS

Quality...In Service

Palarco Inc., a leader in providing professional consulting services in information technology since 1977, continues to expand. With a professional staff second to none, we succeed because we invest in our people through formal training and education in current technologies and provide challenging career opportunities.

Recently Palarco was selected to be part of a premier project in Atlanta. Our team will be responsible for complete systems integration testing for a large AS/400 client/server development effort utilizing the latest in technology. We seek professionals with the following skills:

- **Application Testers with AS/400 data base experience and SQL (Atlanta only)**

In addition we seek individuals with any of the following skills for other opportunities in our Atlanta, Southeastern PA and New Jersey offices:

- **AS/400 RPG**
- **AS/400 COBOL**
- **SSA BPCS**
- **Visual Basic**
- **EDI - Project Leader (SE PA only)**
- **Oracle Forms/SQL**
- **SAP ABAP**
- **AS/SET**
- **Powerbuilder**

We offer excellent salaries and extensive benefits, including medical, profit sharing and 401k opportunities. For consideration please FAX resume in confidence or send to:

Southeastern PA and New Jersey:
FAX: (610) 687-3615 or
Palarco Inc., 996 Old Eagle School Rd., Suite 1116, Wayne, PA 19087, Attn: Recruiting Manager.

Atlanta:
FAX: (404) 564-8683 or
Personnel Manager, Trade Port Distribution Center, 3105 Sweetwater Rd. Building 200, Suite 220, Lawrenceville, GA 30244

Phila, PA • Atlanta, GA • East Brunswick, NJ

Database Administrator

Join forces with Pfizer Inc, a multi-billion dollar leader known worldwide for its technology-intensive products. We currently have a career opportunity for a computer science specialist with 2-3 years hands-on experience in Rdb or ORACLE, VMS, DCL, SQL and FORTRAN. Familiarity with VAXSET, DECScheduler, UNIFACE or PC Networking is desirable. A BS or Master's Degree in Computer Science is also required.

This position is based in our seaside-Connecticut Headquarters, and holds responsibility for all database maintenance including monitoring for adherence to standards, creating copies of databases and transferring and installing databases across sites. You'll also manage database security for all production systems. By tracking all database activity, we'll count on you to do everything it takes to ensure database availability for users and provide user support for our varied in-house production systems. To get on the inside track you'll need a solid track record of success managing similar responsibilities, excellent verbal and written communication skills as well as outstanding organizing abilities.

In return tor your time and talents, we offer a fully competitive salary, excellent benefits, and every possible opportunity to advance professionally. For immediate consideration, send your resume to: **Mr. D.S. Meyers, Supervisor, Employee Resources, Pfizer Central Research, Eastern Point Road, Groton, CT 06340. Fax: (203) 441-5982.**

We are an equal opportunity employer. M/F/D/V.

Pfizer

Central Research

An Invitation for Nominations

Announcing the Second Annual Employment Management Association Foundation School / Business Partnership Award

Sponsored by

THE WALL STREET JOURNAL.

The School/Business Partnership award has been established by the EMAF to recognize School and Corporate collaboration in developing and implementing programs which address critical employment needs. The award is open to all private and public elementary and secondary schools and businesses that institute innovative programs. Program focus is on school-to-work awareness and transition programs in critical areas of employment need.

Areas presently include college preparatory, technical and vocational field applications of:

Accounting
Allied Health
Chemical, Biological & Physical Science
Mathematics
Computer Sciences

Nominations forms are available from:

The EMA Foundation Award
c/o Computerworld
375 Cochituate Road
Framingham, MA 01701

Completed nominations must be received no later than February 21, 1995.

EMAF
EMA FOUNDATION

SOUTHEAST

Work and play in one of the most desirable areas:

beaches • mountains
lower cost of living
year-round golf • lakes

- Client Server
- Mainframe
- Networking

ACP

Salaried • Full Benefits • 401(k)
Referral $

American Computer Professionals, Inc.
P.O. Box 11159
Columbia, SC 29211
800-933-9227
Fax: (803) 779-1955
Internet: ACP@SCSN.NET

equal opportunity employer

Marketing Sales Manager; Resume only; 9-5 p.m.; 40 hrs; $30K; 4 yrs work exp; 2 yrs internship; High School Diploma; must speak, read & write Spanish & Portuguese; foreign market experience & be able to travel 20% of the time; manage sales activities of corporation; direct staffing, training & performance evaluations; develop & control sales programs; negotiate distribution authorizations & develop the market; marketing strategies; control & supervision of sales force on Apple products & related lines; reviews market analysis to determine customer needs; price schedule presentation & explanation to client of Apple products, Sharp Scanners, Super Mac Monitors & video cards; experience in S. American markets; customs & sales strategies for Apple products including Argentina, Chile, Brazil, Uruguay & Venezuela; supervise 9 workers; Resumes Only to Job Service of Florida, 701 S.W. 27 Ave., Rm 47, Miami, FL 33135-3014, Job Order #FL 1146048.

Systems Analyst: Design, development, testing and maintenance of a computerized retailer financial system. Projects are done on the IBM 3090 mainframe computer with MVS/XA Operating System using IDMS/R software and IDMS/R dalabase with MVS/XA architecture. Must know: IBM 3090 mainframe, MVS/XA OS, IDMS/R database with MVS/XA. For Design: IDMS, ADSO, ADSG, FLOWCHART, MS-WINDOWS, OS/2. For Development: COBOL, COBOL II, EASYTRIEVE, TSO/ISPF, OLM, JCL, CA-TOOLS, FILEAID. For on-line system development: IDMS-DC and APC. Req. BS Engineering or Comp Sci plus 1 and 1/2 yrs exp. Salary: $33,500 to $38,500/yr, 40 hrs/wk. Apply in person or by resume to: Georgia Department of Labor, Job Order #GA 5801661, 2636 N. Druid Hill Road, Atlanta, GA 30329-3909 or the nearest Department of Labor Field Service Office.

Information Technology Professionals

Computer Generated Solutions, Inc. is a national software and technology services company, recently recognized by INC. Magazine as one of the fastest growing Corporations in America. Our Professional Services Division is experiencing continued growth. As a result, we have requirements for seasoned Professionals in the following areas:

CLIENT SERVER, OOD
- Sybase, Oracle, SQL Server, Informix
- C, C++, UNIX
- Tuxedo, Encina
- Digitalk, Smalltalk, Gupta SQL
- VB, PowerBuilder
- Banking, Brokerage
- Telecomm

MIDRANGE/MAINFRAME
- AS/400, RPG or COBOL
- RS6000, AIX, COBOL or C
- COBOL II, DB/2, CICS

SOFTWARE PACKAGE IMPLEMENTATION
- Lawson Financials
- JD Edwards
- ACS - Apparel

CGS offers a dynamic environment, competitive salaries & benefits package including a 401(k) plan. For immediate consideration, please call or fax resume in confidence to:

Professional Services Division
Computer Generated Solutions
250 Broadway, 19th Floor
New York, NY 10007

Computer Generated Solutions, Inc.

(212) 239-0230 or 800-776-0793
FAX: (212) 967-8218

New York • Atlanta • Chicago • Los Angeles • Tampa

Computer Software Consultancy organization seeks Systems Analyst/Software Engineer Duties: Analysis, design, development and implementation of software applications in areas of Banking Application. The responsibilities include requirement analysis, database design quality assurance coding, testing, enhancements and documentation using IBM AS/400; RPG III, COBOL, CL, PC Support in IBM AS/400 and Informix, BTRIEVE, C on UNIX machines. B.S. in Computer Science. Two years Software Engineer experience is required. Must have expertise with Banking Applications using RPG, CL, QUERY and IBM AS/400 and C, COBOL on UNIX based machine. Travel required. 40 hours/week, 8:00 A.M. to 5:00 P.M. $36,500.00/year. Must have proof of legal authority to work in the U.S. Contact or send resumes to Georgia Department of Labor, Job Order #GA 5801313, 1535 Atkinson Road, Lawrenceville, GA 30243-5601. An Employer paid advertisement.

McVey & Associates, Inc.

CONTRACT/PERM POSITIONS IN SOUTHEAST

DB2/CICS/DATACOM
IMS DB/DC
AS400/RPG 400
BPCS/JDE
MACPAC
ORACLE 7, UNIX
SYBASE/POWERBUILDER

FOR MORE INFORMATION
CALL: 800-467-9016
FAX: 910-229-7381
COMPUSERVE: 75143,1305

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

For over two decades, Computerworld has delivered qualified job candidates to America's employers.

And ever since Computerworld's first weekly issue in 1967, America's companies have relied on *Computerworld* to target America's most qualified computer job candidates.

To place your ad regionally or nationally, call John Corrigan, Vice President/ Recruitment Advertising, **at 1-800-343-6474; x 201 (in MA, 508/879-0700).**

COMPUTERWORLD

CORPORATE OBJECT GROUP

ITT Hartford, one of the oldest, most successful, and stable insurance organizations in the country, is currently seeking technical professionals to join its Corporate Object Group located in Hartford, CT.

OBJECT-ORIENTED BUILDER

The selected candidate will be responsible for the construction of corporate-level "infrastructure" object classes to provide utility functions and be leveraged by segment developers. You will review and harvest classes deemed appropriate for inclusion into the class library. Other duties include working with the Corporate Object Group and assisting project teams in developing classes to meet specific needs. Experience with C++, Smalltalk and relational data base products is beneficial. Experience developing classes in an insurance environment and ability to integrate Smalltalk classes into ParcPlace VisualWorks are required.

OBJECT DATA BASE SPECIALIST

We seek an individual to be responsible for object data base tactical planning for the corporation. Duties include installing, configuring and maintaining an object data base for the corporate class library and for group development and testing. Other tasks include implementing an object data base network, performing product evaluations and providing resources for operational support personnel on ODBMS issues. Knowledge of C++ or Smalltalk and experience supporting object data base products is required. Experience with GemStone, ObjectStore, Versant and relational technology coexistence and migration is a plus.

CORPORATE CLASS LIBRARIAN

This individual will assume responsibility for the administration of class specifications within the corporate object repository. Tasks include helping to define a system for easy navigation through the corporate library and managing multiple classes within the library. You will be a resource for library users and advertise available classes through internal publications. Experience in a large scale class library is desired. A working knowledge of C++, Smalltalk, ParkPlace VisualWorks Library and OTI ENVY is required. An understanding of the insurance business is a plus.

Please send resumes with salary history to:

Karon Moore, HO-1-6

ITT HARTFORD
Hartford Plaza
Hartford, CT 06115

Fax (203) 547-2680

Equal Opportunity Employer

ITT HARTFORD

DMR – A World Without Limits . . .

In 1973, we began with a wealth of ideas and the spirit of a startup. Now, more than 20 years later, DMR Group, Inc. has become a leading international provider of Information Technology services to public and private clients worldwide. Our innovative methodology-based solutions have satisfied a growing list of customers. Our continuing challenge is to extend the spirit and energy we first brought to the industry 20 years ago. One thing we'll continue to do is hire people with a fire inside that drives them toward excellency and away from complacency. If that describes you, we'll give you everything you need to reach deep and go anyplace your capabilities take you.

DMR

When know-how counts

SENIOR PROJECT MANAGERS

Senior professionals with a successful track record managing complex multi-million dollar, multi-year custom application development projects involving large scale multi-disciplinary teams. These are business driven projects which require candidates who possess in-depth knowledge and experience in the following areas:

- strong skills in planning large projects, establishing project objectives, managing scope, and delivering on time within budget and quality parameters.
- solid analytical problem solving skills
- a broad based technical background including methodologies, information engineering, tools and techniques.
- a minimum of 10 years experience managing and delivering all phases of the system development life cycle.

Good business judgement, excellent leadership skills, and the capability to build strong client relationships are essential. At least three years consulting experience is preferred.

LEAD SYSTEM ARCHITECTS

Senior information systems professionals with a successful track record in the execution of large systems development projects. Responsible for translating business objectives and requirements into effective systems designs and solutions. Candidates must possess in-depth knowledge and experience in the following areas:

- the use of methodologies, case tools and techniques in a variety of hardware and software environments.
- structured analysis including data and process modeling.
- new development approaches including prototyping, object orientation, client/server, and GUI interfaces
- large scale projects involving complex business/systems solutions.
- minimum of 10 years in execution of all phases of the system development life cycle.

Strong communication and leadership skills coupled with the ability to influence and persuade others are essential. At least three years consulting experience is preferred.

Our success is solid - our opportunities are immediate. If you possess highly effective technical and consulting skills , please forward your resume to Sheila Yossem, Recruiting Manager, DMR Group, Inc., 404 Wyman Street, Suite 450, Waltham, MA 02154. Opportunities available in Boston, Seattle, San Francisco, Los Angeles and other locations.

USA • CANADA • ASIA-PACIFIC • EUROPE

CONSULTANTS WANTED

The Computer Express Companies, a nationally known Software Consulting group, is now staffing projects located from Massachusetts to Florida - ***and paying TOP rates!*** We currently have positions available for individuals with 2+ years experience in any of the following areas:

• PL/1, CICS • IMS, DB/DC • DB2, COBOL II
• HP3000, COGNOS • SYBASE • ORACLE
• AS/400 • C • WINDOWS NT • PCMCIA
• NOVELL CNEs • BANYAN CBEs • FOXPRO
• C++, MOTIF • Benchmarks • AIX Internals
• PC 3rd Party H/W Compatibility Testing
• FOCUS • V.B. • MS ACCESS • CLIPPER 5.x
• M.I.S. • S/W Eng • H/W Eng • Q/A Testing

Call for details, or send resume directly to our Corporate Headquarters:
Computer Express, Inc.,
Post Office Box 308
Wakefield, MA 01880
attn: Recruiting Department
voice 617-246-4477
fax 617-246-1434

CEI

We're not just growing. We're growing better.

The Stop & Shop Supermarket Company, one of New England's largest employers, is a leader in technological innovation. The thread that has stitched our operation together, and the focal point that is driving the company into the future, is leading edge technology.

Programmer Analysts

We have exciting opportunities for dynamic people to join our systems team as Programmer Analysts. These positions offer the opportunity to learn and work in a multi-platform environment (PC's, IBM Mainframe, AS/400, UNIX, RISC, Wang, etc.) supporting leading-edge software and hardware, local and wide area networks (Novell & Banyan), and all the latest tools and technologies.

Stop & Shop, as an industry leader, offers competitive salaries, comprehensive benefits, and all the convenience of a BOSTON South Shore headquarters. Interested candidates should forward a resume to:

Jay Purnell
Employment Specialist
The Stop & Shop
Supermarket Company
P. O. Box 1942
Boston, MA 02105

STOP & SHOP

Our leadership, advanced technology, and customer service are the result of our continuing efforts to provide a diverse and equal opportunity working environment.

All trademarks belong to their respective companies.

SMS PROGRAMMER ANALYSTS

Numerous opportunities exist within western PA for all levels of DP professionals. For more information call Therese Bell at 412-887-3344. For immediate consideration please fax your resume to 412-887-9198.

Cameron of Pittsburgh, Inc.
412 Lawyers Bldg.
428 Forbes Ave.,
Pittsburgh, PA 15219

RELOCATION SPECIALIST

IBM MAINFRAME
PC - CLIENT SERVER

I specialize in relocating DP professionals to growth areas of the United States. Fees Paid by hiring company. 16 years DP Search & Placement experience.

John M. Cook
COOK & ASSOC., INC.
P.O. Box 1778
Duxbury, MA 02331
1-617-934-6571
Fax: 617-934-6399

programmer analyst

A growing company in Central New York is enjoying persistent growth and seeks a Programmer/ Analyst with at least 2+ years of Application Design and Development in an AS/400 and RPG III environment.

Requirements for the successful candidate are:

- **Thorough programming skills in RPG/400 or RPG III.**
- **In-depth understanding of structured programming and CASE Tools, preferably ADELIA.**
- **Strong communication skills and a working knowledge of PCs and barcode equipment.**
- **Experience in C++ and Oracle as well as skills in a manufacturing environment is desirable.**
- **BS degree in Computer Science or it's equivalent.**

For confidential consideration, please forward resume and salary history to:

Director of Human Resources
NCC INDUSTRIES, INC.
165 South Main Street
Cortland, NY 13045

PITTSBURGH

Robert J. Depaul & Associates is recognized as one of the Premier I.S. Consulting firms in Western PA.

Consulting & Permanent opportunities currently exist:

- *CLIENT SERVER DEVELOPERS*
- *SR NETWORK CONSULTANTS*
- *APPLICATION PROGRAMMERS:*

DB2, CICS, IMS, CSP, OS2, ORACLE, C++
POWERBUILDER, NOVELL, DATACOM

Mail or fax resume to: Marketing Director
Robert J. DePaul & Associates, Inc.
Brookside Office Park Suite 208 Phone (412) 561-0417
71 McMurray Road
Pittsburgh, PA 15241 Fax (412) 831-5208

DELORME MAPPING

is a nationally recognized leader in the development and sale of maps, atlases and multimedia software for the consumer, business and government markets. We have immediate positions available for well-organized, adaptable individuals with the following skills and experiences:

ORACLE DBA

Dedicated, flexible individual required to monitor, tune and control the ORACLE database, which supports Sales and Marketing, Distribution, Technical Support and Financial Reporting systems. Relevant Bachelor's degree plus a minimum of 5 years' experience ORACLE database administration (V6 required, ORACLE7 desirable), plus 3 years' experience application programming using SQL*Plus®, PL/SQL™, SQL*Forms® v3.0, SQL*Report® and SQR™.

PROGRAMMER/ANALYST

Skilled Programmer/Analyst required to enhance existing Sales and Marketing, Distribution, Technical Support and Financial Reporting systems.Relevant Bachelor's degree plus a minimum of 5 years' experience using SQL*Plus®, PL/SQL™, SQL*Forms® v3.0, SQL*Report® and SQR™ in a UNIX environment. Accounting or distribution experience a plus.

SOFTWARE ENGINEERS

BS/BA in Computer Science and/or experience programming in C/C++, preferably experienced with Microsoft® software tools: Microsoft Visual C++ using MFC. Database experience is helpful, especially spatial databases. We need engineers for three basic areas: database management, library programming and application building with an interest in solving user-interface issues. Experience with data visualization and map symbolization a plus. Knowledge of 3-D mathematics, various projections is desired.

Please send résumé, references and salary history to the attention of the Human Resources Department. AAE, EOE. FAX: (207) 865-7080. *No phone calls please.*

P.O. Box 298, Lower Main Street
Freeport, ME 04032

COMPUTER PROFESSIONALS!

Forbes has included Paychex on its list of "Best 200 Small Companies in America" three years in a row! Join our team of skilled technical professionals and discover exciting career opportunities at high growth national payroll service company in Rochester, NY. Due to expanding business, the following opportunities are available for candidates with strong communication skills and proven ability to work in a fast-paced team environment.

Oracle DBAs

Minimum 2 years Oracle or RDB development experience on UNIX. DBA experience a plus! Challenging support position with development project responsibilities. Includes physical design, account and security administration, back-up and recovery, performance tuning and capacity planning.

Programmers

1-5 years COBOL programming experience. SQL, C or UNIX exposure desired. Will consider entry candidates with coop experience and BS, CS or IS.

Programmer/Analysts

1-4 years programming experience with UNIX and C. Experience writing specifications and working with formal life cycle process is required. Relational database experience is a plus. Oracle training may be provided.

Product Support Representatives (UNIX)

1-2 years technical problem resolution experience, strong customer service skills and knowledge of hardware and software in a UNIX environment. Experience with technical telephone support desired.

Technology Leader

5-7 years experience in technical and/or supervisory role including knowledge of client/server, RDBMS, Windows, SQL and 4GL's.

Systems Programmer

1-5 years experience with three of the following areas: UNIX, Windows, C/C++, client/server, lexical analyzers & translators, RPC or sockets.

Limited relocation may be available. Fax or send resumes immediately to:Paychex Incorporated - ADCW, 911 Panorama Trail South, Rochester, NY 14625. Fax: (716) 383-3449

PAYCHEX®

PROGRAMMERS



Reliance Systems, Inc. has provided quality consulting services since 1984. Our continuing growth has led to additional staffing requirements in Rhode Island and Massachusetts.

Salaried candidates should possess two plus years experience in any of the following areas:

- PL1, COBOL, CICS, VSAM
- AS 400, RPG III, 400
- IMS, IDMS, DB2
- DBS/MSA/GL/IE
- UNITECH/ACR
- DOCUMERGE
- VANTAGE/INSURANCE
- LOTUS NOTES, VISUAL BASIC
- MAGIC PC, Windows NT
- SYBASE, ORACLE

Contracting Assignments Available

We provide challenging assignments, excellent compensation, and an attractive benefits package.

Forward resume to: Reliance Systems, Inc., 40 Washington St., Wellesley, MA 02181 (617) 237-3002, FAX (617) 237-0740

RELIANCE SYSTEMS

Yankee Book Peddler is an international supplier of scholarly materials and technical services to academic and research libraries. We are based in the beautiful, tax-free state of New Hampshire, within close proximity to the mountains, ocean and city of Boston. We are now seeking candidates for the following position:

AS/400 PROGRAMMER/ANALYST

Successful applicant will have 2+ years of hands-on AS/400 production programming experience using RPGIII. PC support, C++ or Visual Basic experience would be helpful. Environment: Multiple AS/400's with programmer development system. Moving to AS/400 Visual RPG for Client/Server support. TCP/IP Internet access for worldwide network.

Please send resume with salary requirements to:

Laurie Sanborn
Yankee Book Peddler
999 Maple St.
Contoocook, NH 03229

EO/AAE

SOFTWARE ENGINEER: Study, analyze, design, develop, test and implement commercial and business applications software using ORACLE 6.0, SQL* Forms 3.0, PRO*C, SQL*Reportwriter, FoxPro 2.5 under UNIX, DOS and NOVELL Netware. Should have complete knowledge/understanding of UNIX based machines and NOVELL Netware. Requires fine tuning of various network applications to improve the performance of the application, and to decrease memory usage by writing efficient algorithms. Must be able to prepare user/system documentation and instruction manuals as required by the end user(s). Should have good written and verbal communication skills. Must be able to work independently and coordinate with team members to meet project deadlines. Rqr. Bachelors degree in Computer Science or equivalent; 2 years exp. as Software Engin. or Systems Analyst. 40 hrs/wk 8:00 a.m. to 5:00 p.m., $42,000/yr. Apply to GA Dept. of Labor, Job Order # GA 5802646, 1535 Atkinson Rd., Lawrenceville, GA 30243-5601 or DOL Field Service Office.

Information Systems Analyst (9946)

BA in Info-Systems and four years planning, tele-communications, full system development life cycle, project management. Salary $32,774 - $40,783. Apply Dept. of Human Resources, City of Norfolk, VA 23510 by January 17. EEO/H.

DP Consultants

EDP Contract Services seeks Mainframe and Client Server Consultants for assignments in the Hartford area.

DB2 - IMS - IDMS
IEF-SAS - FOCUS - SYBASE
POWERBUILDER
ORACLE8 - ACCESS

EDP Contract Services
30 Waterside Drive
Farmington, CT 06032
fax (203) 677-8030

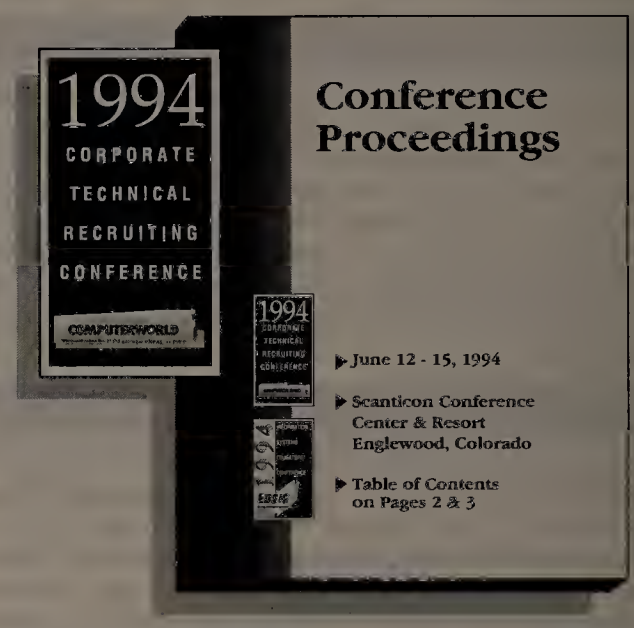
ATTENTION: HIRING MANAGERS

When you compare costs and the people reached, *Computerworld* is the best newspaper for recruiting qualified computer professionals. Place your advertisement today!

Call toll-free 800-343-6474 ext. 201
(in MA, 508-879-0700)

COMPUTERWORLD

LEARN TECHNICAL RECRUITING *from the* EXPERTS!



If you recruit Information Systems talent and want to get expert advice, you'll want to order the complete proceedings from Computerworld's 1994 Corporate Technical Recruiting Conference, held June 12-15 in suburban Denver. For just $49 plus $3.50 for shipping and handling, you'll receive this 200-page book that's packed with over 50 presented papers on subjects ranging from sourcing techniques, Client/Server recruiting, professional development, corporate recruiting networks, and much more. And all papers are written by expert I.S. recruiters and educators, so you're sure to learn from top presenters in the field.

To order your copy, simply fax or send the coupon below. But hurry, because supplies of this one-of-a-kind tool are limited!

To order, fax this coupon to: 1-508-620-9430

Or send to: Computerworld, c/o Price Lampert Associates, 187 Oaks Road, Framingham, MA 01701

- ❑ Please rush me the 1994 Conference Proceedings
  - ❑ I've enclosed my check for $49 + $3.50 for shipping & handling
  - ❑ Please bill me
- ❑ Please ❑ send *or* ❑ fax me information about the 1995 Corporate Technical Recruiting Conference and 1995 Worldwide Conference on Information Systems Education, June 11-14, 1995 at the Scanticon Conference Center & Resort in surburban Denver.
- ❑ I'm interested in submitting a paper for presentation at the 1995 conference

Topic: _____

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____ FAX _____

TECHNICALLY, PHCS SPEAKS YOUR LANGUAGE.



PHCS has established an exciting record of growth and success as a national managed healthcare organization positioned on the leading edge of today's technology. If you're looking for opportunity, challenge and the chance to work with the latest, most advanced technologies - it's time to talk to PHCS.

Sr. Programmer/Analysts - Oracle

PHCS' dynamic Systems Development teams are looking for talented Programmer/Analysts to interface with end users, analyze problems, and develop information systems using state-of-the-art tools, including ORACLE in a UNIX environment. Ideal candidates will have 3-5 years of programming experience in business applications utilizing structured development techniques, experience with ORACLE RDBMS, SQL*Forms, SQL NET, PL/SQL, SQL*Plus and Report Writer. Recent UNIX experience, a BSCS and excellent interpersonal skills also required. Experience with ORACLE 7 and SQL Forms 3.0 plus. **Dept. CD/PA**

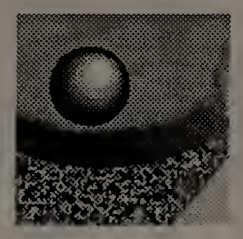
Sr. Systems Analyst

This position offers a highly motivated Sr. Systems Analyst the opportunity to communicate extensively with PHCS internal customers, clients, and outside industry sources to prepare business analysis, user requirement documents, and systems designs, as well as support reverse and reengineering efforts. Qualified applicants need at least 5 years of increasingly responsible business and systems analysis, system design, development and implementation experience. A technical degree is required. **Dept. CD/SA**

PHCS offers competitive salaries and excellent benefits including health/dental insurance, 401(k) plan, 3 weeks vacation and tuition reimbursement. Please submit your resume, referencing the above departments, to: Private Healthcare Systems Inc., 1100 Winter Street, Waltham, MA 02154. An Equal Opportunity Employer, M/F/D/V.

PHCS PRIVATE HEALTHCARE SYSTEMS

Elevate Your Career To A New Level In 1995



Computer Sciences Corporation is a world leader in the science of information technology and its application to achieve clients' business objectives. Serving a wide range of industries as well as state and local governments, CSC Consulting provides comprehensive services in management consulting, systems integration and technology consulting.

CSC

CSC Consulting. We're challenging old ideas. Developing new solutions. And reengineering industry for the 21st century. And now, you can become part of our success in the NY/NJ metro region. We're seeking effective communicators who are as comfortable with business as they are with sophisticated technology. If you have a willingness to travel and are committed to quality, you can become a part of our success.

Client Server Architects/Developers

Work with a variety of clients and industries utilizing client server development tools. You will transform business requirements into productive systems in fast-paced, rapid application development environments. We require 2+ years' full life cycle development with C, UNIX, and SQL based RDBMS's (Oracle, Sybase); working experience with PowerBuilder, C++, or Windows programming considered a plus.

Database

Implementation experience in multiple relational database systems such as ORACLE, SYBASE, INFORMIX, SQL Server and/or GUPTA SQL. Demonstrated accomplishments in full life cycle from logical design through performance tuning.

Project Managers

You will direct large system development and integration projects from inception to delivery. Along with 8-12 years' related experience, you must have superb large project management skills, excellent sales abilities and proven accomplishments in delivering large projects on time, within budget and with exceptional quality.

We offer a salary commensurate with your expertise, comprehensive benefits and all of the challenge you'd expect from a world-class leader. Please send your resume to: **CSC Consulting, 300 Executive Drive, Suite 300, West Orange, NJ 07052, Attn: Scott W. Stahlmann, Recruitment Manager, Dept. CW. FAX: (201) 243-7540.** An Equal Opportunity Employer M/F/D/V.

DATA PROCESSING PROFESSIONALS

Seltmann, Cobb & Bryant, Inc., a National Data Processing and Information Services Company, has immediate long-term opportunities **throughout the US.**

We are currently looking for individuals possessing any of the following skills to fill Programmer Analyst positions:

• IMS DB/DC	• IDMS	• ADABAS/ NATURAL
• DB2	• TELON	• GUPTA
• COBOL	• NOVELL	• ORACLE
• CICS	• INGRES	• CASE TOOLS
• VAX/VMS	• DEC FORMS	• UNIX/C
• AS400	• RPG	• (IEF)
	• POWER BUILDER	

SCB offers competitive salaries, a comprehensive insurance package, employee stock option plan and a 401K program. **Take your first step toward making your career complete by sending or faxing your resume to:**

Seltmann, Cobb & Bryant, Inc.
Attn: Debbie Perdzock
1375 West Brierbrook Road
Memphis, Tennessee 38138
FAX: 901-756-7497
An Equal Opportunity Employer

Edge Out the Competition

NewNet Inc., a leading edge company specializing in applications on advanced intelligence networks and cellular products, is seeking:

Software Engineers

Exciting opportunities exist for qualified professionals to design and develop real-time systems, specification and application software for UNIX-based telecommunication products.

Applicants should have a BS/MS in EE/CS, with 1-6 years of design experience in UNIX operating systems and C++.

Background in one or more of the following areas is strongly desired:

- Communication and signalling protocols
- SS7-TCAP
- OSI
- Call Processing
- Database Management
- Transaction Processing Systems
- Graphical User Interface

Please mail or fax your resume to:
NewNet Inc.,
755 Main Street,
Monroe, CT 06468;
Fax: 203-459-9205

NewNet Inc.

ADEPT



FOR THE PERFECT FIT
We take the time to know your ideal assignment preference and match your technical background with our clients' needs and corporate environment to provide the "perfect fit."

IMMEDIATE OPENINGS

- C++,WINDOWS
- ACCESS or VISUAL BASIC
- POWERBUILDER
- SYBASE
- WINDOWS, QA-Testers
- ADABAS, NATURAL
- CICS, COBOL, VSAM
- CICS, DB2, TELON
- IMS-DB/DC w/wo PL/1
- AS/400, RPG-III
- Healthcare Analysts
- SAP or EDI

Send or FAX your resume to: ADEPT, Inc., 888 Worcester Rd., Wellesley, MA 02181, Phone (617) 239-1700, FAX (617)237-0892. Internet: adept@world.std.com.
Member NACCB/EOE

ADEPT
The Absolute Choice

NETWORKS SUPPORT SPECIALISTS

Agfa is the Imaging Technologies Division of Miles Inc., a multi-billion dollar, research based, Fortune 100 company and global leader in innovative imaging systems and products for the graphics, medical and photographic imaging markets.

Our sustained growth has created immediate temporary opportunities lasting 18-24 months in the Metro NY area for individuals to provide system installations and support and train customers on our medical picture archiving and communication application products.

To qualify, we require a Bachelors' degree in Electronic Technology or Computer Science and a solid background in Sun Unix Network installation, routing, configuration, systems administration and troubleshooting. Experience in Ethernet TCP/IP, SOLARIS, NFS, and Internet technology gained through 3+ years in network system installation and administration are also essential. PACS, Radiograpic Imaging and Discom experience are a plus.

We offer an attractive salary and comprehensive benefit program. To be considered in confidence, send a resume with salary history to: Dept. RW-NSS, Agfa Division, Miles Inc., 100 Challenger Road, Ridgefield Park, NJ 07660. An equal opportunity employer m/f/h/v. (No phone calls please).

MILES
AGFA Division

WE WORK FOR YOU!

AMERICA'S WORK EXCHANGE, INC.

Providing lucrative, exciting, flexible & challenging assignments for the most discriminating professionals.

You must have designed, implemented, or administered "Distributed Open Systems" and have expertise in any of these technologies: **GUI, OOD, Multimedia, RDBMS, Internetworking, Groupware, Client/Server Computing, Messaging, Distributed Systems & Network Management, and related technologies.**

Find out about our superior benefits options, membership privileges, training, and business partner revenue sharing programs.

Fax Resumes to: **1 800 SEND AWE**
P.O. Box 313, 784 Morris Tpke., Short Hills, NJ 07078-2698

MIS PROFESSIONALS

JAMES RIVER CORPORATION employs approximately 35,000 people. Our products include brands such as **QUILTED NORTHERN®** bathroom tissue, **BRAWNY®** paper towels, **VANITY FAIR®** and **DIXIE®** premium foodservice products, **EUREKA!™** recycled and **WORD PRO®** copy papers, and **QUILT-RAP®** sandwich wrap.

Having implemented new systems involving leading edge technologies, **JAMES RIVER** has an ongoing need for a wide variety of MIS professionals. We offer competitive salary and an excellent benefits program. Interested candidates should forward resumes to **JAMES RIVER CORPORATION** Human Resources Department # 9000, P O Box 2218, Richmond, Virginia 23217 Equal Opportunity Employer

JAMES RIVER CORPORATION



There's a world of opportunity at CTG. And it comes in all shapes and sizes.

CTG consultants are spearheading global Information Technology initiatives with prestigious clients worldwide, including the majority of the Fortune 100. We're also providing small-scale solutions for the local start-up right in your hometown.

Either way, we can do a world of good for your career. We'd like to hear from you.

ctg

Putting Information To Work.

800 Delaware Ave.
Buffalo, NY 14209
Phone: (800) 992-5350
Fax: (716) 887-7246

Equal Opportunity Employer

WE'RE CONNECTED ...ARE YOU?

LET US HELP MAKE '95 THE BEST YEAR OF YOUR CAREER!

Wilkinson SoftSEARCH has placed hundreds of qualified mid-to-senior-level IT professionals into challenging and rewarding careers. Our clients' numerous active job openings indicate that 1995 will be another strong year. If you currently possess outstanding technical or functional skills, please let us review your resume for the following nationwide job opportunities in the $50K-$175K range:

LEADING-EDGE SOFTWARE VENDORS

Pre-Sales/Tech Support • Product Developers • Technical Consultants
Sales Reps • Business Developers • Tech Support Mgrs • Systems Engineers
Nat'l Consulting Services Marketing Mgr • Consulting Services Mgr

FORTUNE 500 END-USER ORGANIZATIONS

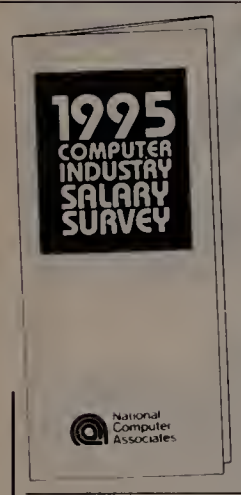
IS Directors • Business Analysts • Data & Methodology Administrators
CIO's • IEF/CASE Tool Experts • DBA's • Client/Server Network Analysts
Project Mgrs • Information Engrs • Business Process Re-Engrs • IS Architects

MGMT/STRATEGY/TECHNICAL CONSULTING FIRMS

Client/Server Consultants, Managers & Partners • SAP & IEF Consultants
Sr. Managers for Telecom, Manufacturing, Pharmaceutical & Banking Practices

Please respond in confidence:
703/ 352-1797 FAX
2010 Corporate Ridge
Suite 700 McLean, VA 22102
703/ 749-1421
Sorry, No Contractors

WILKINSON SoftSEARCH INC.
Information Technology Search & Recruiting



FREE! 1995 COMPUTER INDUSTRY SALARY DATA

Vital Planning Guide for Candidates & Employers

As 1995 unfolds, up-to-the-minute data on compensation trends within the U.S. Information Systems industry will be critical to the career planning and staffing strategies of every I/S candidate and employer. To give I/S professionals that vital strategic edge, the member firms of National Computer Associates now offer you our '95 Salary Survey pamphlet, which projects salaries for 26 industry job titles in all major U.S. regions. **For your FREE copy, call the professional nearest you.**

Contact us today for 1995 career openings & qualified candidates.

BOSTON: The Kleven Group, Inc. (617) 861-1020 • FAX (617) 861-1047
CHICAGO: Career Consultants, Inc. (708) 663-9780 • FAX (708) 663-9784
CINCINNATI: Task Group (513) 772-7752 • FAX (513) 772-7688
DALLAS: DalaPro Personnel Consultants (214) 661-8600 • FAX (214) 661-1309
DENVER: Abacus Consultants, Inc. (303) 759-5064 • FAX (303) 759-9846
FLORIDA: Richard Rita (813) 289-3000 • FAX (813) 289-8173
GREENSBORO: DataMasters (Dept. CWN) (910) 373-1461 • FAX (910) 373-1501
HOUSTON: Career Consultants, Inc. (713) 626-4100 • FAX (713) 626-4106
KANSAS CITY: DP Career Associates (913) 236-8288 • FAX (913) 236-9748
MILWAUKEE: EDP Consultants, Inc. (414) 255-9363 • FAX (414) 255-5459
MINN/ST. PAUL: ESP Systems Prof., Inc. (612) 337-3000 • FAX (612) 337-9199
NEW YORK: Botal Associates, Inc. (212) 227-7370 • FAX (212) 964-5033
PHILADELPHIA: Systems Personnel, Inc. (610) 565-8880 • FAX (610) 565-1482
PHOENIX: Professional Career Consultants (602) 274-6666 • FAX (602) 443-8489
SAN DIEGO: Technical Directions, Inc. (800) 367-1017 • FAX (619) 297-6951
SAN FRANCISCO: Professionals For Computing, Inc. (415) 957-1400 • FAX (415) 957-0166
SEATTLE: Houser, Martin, Morris & Associates (206) 453-2700 • FAX (206) 453-8726
ST. LOUIS: Executive Career Consultants Inc. (314) 994-3737 • FAX (314) 994-3742
SYRACUSE: Accounting & Computer Personnel (315) 457-8000 • FAX (315) 457-0029

National Computer Associates

Systems Analyst to design and develop real estate management information systems for clients. Lead a product development team, write software product proposals and specifications, analyze product requirements, design product architecture, develop project schedules and report on periodic product status. Perform comprehensive research and development of new technologies for real estate finance, investment analysis, and management information systems and applies those technologies to the product design and development. Requirements: M.S. in Electrical Engineering. Degree specializing in systems engineering. Thesis in pattern recognition or if no thesis, 6 months experience as a Systems Analyst using pattern recognition. Experience: 6 months in the job offered or 6 months as a Systems Analyst. Experience must be in designing and developing Microsoft Windows-based software for real estate, investment, and econometrics applications, and doing research and development of new technologies for real estate finance, investment analysis, and management information systems, 40 hrs/wk; 8:00 a.m. to 5:00 p.m.; $45,000/yr. Send resumes in duplicate (no calls) to T. Do, JO8# 00860, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216. Must have proof of legal authority to work indefinitely in the United States.

SOFTWARE CONSULTANT: (2 positions) 40 hrs/wk. 8 a.m. - 5 p.m., $60,000./yr. Oversee the analysis, design and development of real-time, engineering, manufacturing and financial software application systems on DEC mainframes. Carry out project management. Supervise analysts and programmers. Requires Bachelor's Degree in Computer Science, Engineering, Math or Science (will accept 4 yrs. of work expr. as Software Consultant or as Systems Analyst/Software Engineer in lieu of 4 yrs. of college & bachelor's degree). Reqr. 3 yrs. expr. in job offered, or 3 yrs. expr. as Systems Analyst/Software Engineer. Reqr. work expr. in design and development of manufacturing, financial & on-line application s/w utilizing VAX/VMS mainframes, ACMS, VMS/Rdb Teamdata & Rally s/w, COBOL, PASCAL & BASIC languages. "Employer paid ad." E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. No: 15195.

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

For over two decades, Computerworld has delivered qualified job candidates to America's employers.

And ever since Computerworld's first weekly issue in 1967, America's companies have relied on Computerworld to target America's most qualified computer job candidates.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, **at 800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
Where the qualified candidates look. Every week.

FACULTY FOR EUROPE AND ASIA

The University of Maryland seeks faculty to teach undergraduate computer science, computer applications, and information systems management courses on U.S. military bases in Europe and in Asia and the Pacific. Appointments begin August, 1995. Minimum requirements include a master's degree, recent college teaching experience, and U.S. citizenship. Benefits include transportation and military bases privileges (PX, commissary, etc.). Frequent travel and the cost of schooling make these positions difficult for those with children. Send resume to: **Dr. Ralph E. Millis, University of Maryland University College, Overseas Programs, College Park, MD 20742-1642. AA/EEO.**

Programmer/Analyst - Atlanta, GA. Design and develop windows based applications; enhance & modify systems; provide technical support to end users & user training. Utilize Gupta SQL, Windows, Report Windows, Quest, SQL Talk, C++ Microsoft SDK and Tool Kit on Oracle database. Bachelors/ Computer Science, Engineering or Math. 2yrs/exp. in job offered or 2yrs as Grad. Asst and/or Programmer/Analyst and/or Software Anafyst. Related occupation must include 1yr exp. using Gupta SQL, Windows, Report Windows, Quest, SQL Talk, C++, Microsoft SDK and Tool Kit on Oracle database. 40hrs/wk (8-5). $42,000/yr. Apply in person or by resume to: Georgia Department of Labor, Job Order #GA5771372, 2943 N Druid Hills Road, Atlanta, GA 30329-3909 or the nearest Department of Labor Field Service Office.

PowerCerv

Leading the Migration to Graphical Client-Server Computing

PowerBuilder Consultants/ Developers

PowerCerv is the largest provider of **PowerBuilder** products and services (consulting, training) in North America (#1 in 1993). **PowerCerv's** instructors are **all certified** by **Powersoft Corporation**. Customers seek our expertise to help develop and deploy mission critical **PowerBuilder** applications. Our professional consulting organization offers a full range of development services: *from technical mentoring*, to *co-development*, to *turn-key applications*. **PowerBuilder** is our exclusive development discipline. This focus allows us to be the best in graphical client/server solutions.

PowerCerve is a key member of **Powersofts** advisory boards and is a **Powersoft** CODE Software Developer with leading **PowerBuilder** applications such as:

- **PowerTOOL** (PowerBuilder object class library and inheritance methodology)
- **Response** (custom support/help desk)
- **PowerMAN** (MRPII/Production Control)
- **Xceed** (lead tracking, marketing contact management and quotation system)

PowerCerve offers internal training, career advancement, competitive salary plus bonus, 401K, and full employee health and dental benefits. **PowerCerv** seeks career minded professionals with **PowerBuilder** experience.
Our explosive growth has created dynamic opportunities in the following locations:

Atlanta	Birmingham	Charlotte	Cleveland	Dallas
Houston	Louisville	Miami	Minneapolis	N. Virginia
Orlando	Philadelphia	Portland	Tampa	Washington D.C
New York	New Jersey	S. Carolina	Delaware	California

POWERSOFT CODE SOFTWARE DEVELOPER

If you are ready to join the leader, please forward your resume & salary history to:

Ken Weatherly • **PowerCerv**
400 North Ashley, Suite 1910
Tampa, Florida 33602
(813) 226-2378 · *Voice* • (813) 226-0886 · *FAX*
F-Mail: 74S21,2140@Compuserve.com



As your career progresses, your needs change. Whether it's challenging technology, job security or money and benefits, **Merge Computer Group** has been meeting our employees' needs for over 11 years. **We can meet yours too.** One of Richmond, Virginia's "Rising 25" businesses, we provide contract programming for the area's Fortune 500 leaders. We seek Programmer/ Analysts with experience in the following areas:

- *IMS DB/DC*
- *DB2/CICS*
- *PowerBuilder*
- *AS/400*
- *Oracle*
- *MicroFocus Tools*
- *C/C++*
- *FoxPro/Clipper*

We're exceptionally focused on giving our employees the opportunities they seek and the rewards they deserve – including very attractive salaries, paid overtime and a 401(k) plan. Our historic Richmond, VA location offers a highly affordable, relaxed lifestyle with great schools and endless recreational possibilities. **Relocation assistance is available.** To learn more, contact Skip Goodwillie at 1-800-MERGE US (637-4387) or fax your resume to (804) 288-3963. An Equal Opportunity Employer.

merge computer group inc.

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

For over two decades, Computerworld has delivered qualified job candidates to America's employers.

And ever since Computerworld's first weekly issue in 1967, America's companies have relied on Computerworld to target America's most qualified computer job candidates.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, **at 800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
Where the qualified candidates look. Every week.

INTERNATIONAL TAX FREE OPPORTUNITIES

SENIOR SYSTEMS CONSULTANTS

Systems personnel with good experience in any of the following required for contract positions in Saudi.

- TELON/COBOL/IMS/DB/DC
- PowerBuilder/ORACLE
- GUI Design
- WAN/LAN Novell Design

Excellent tax free salaries, free housing, medical & transport.

These are immediate openings so fax your resume today to:

JATCO
011-966-3-832-0590

With a copy to:
RECRUITMENT INTERNATIONAL
6671 Southwest Freeway, #101
Houston, Texas 77074
Fax: 713-771-4444 Tel: 713-771-7181

SOFTWARE ENGINEER

Responsibilities: Design and develop workflow software on MS Windows environment. Will design, develop, and implement a Workflow enabler for Lotus Notes for current office automation project. Also responsible for improving upon the existing GUI.

Requirements: BS in EE or CS, 2 yrs experience in position advertised, fluent understanding of C++ and C, MS Windows (including GUI and MFC), Lotus Notes application programming interface, and workflow technology.

Hours: 8:00 am - 5:00 pm, Monday - Friday.
Salary: $62,000.

Please send resume to:
Job Service of Florida
2312 Gulf-To-Bay Blvd
P.O. Box C
Clearwater, FL 34618-4090
Re: Job Order # FL-1157211

IE/IEF

MTW CONSULTING
Making Technology Work

We are responsible for the delivery of several multi-year, full life cycle IE/IEF projects. Please contact MTW if your background includes any:
* Project Management
* Any of the IE Stages ISP thru Production
* IEF Database or Technical Support

We are dedicated to IE project engagements, and have been a TI IEF Alliance Partner since 1990.

2300 Main St. #900, Kansas City, MO 64108
(816) 421-5005 • (800) 669-9689
Fax (816) 471-7918

IEF

Composer (5.3) Client/Server, GUI

If you're an IEF Developer or "Top Gun" looking for
• a state-of-the-art project, and
• an opportunity to make a difference...
...we need to talk!

BSI and RAD development Templates/common objects, standards & procedures. Develop Coord and/or Ency Admin.

FUSION

is an Advanced Technologies Consulting Firm, specializing in CASE, Client/Server, GUI, EAP, BPR and JAD

1-(800) 230-FUSN
Phone (214) 733-0577 or FAX (214) 733-4430
5819 Windmier, Suite 250 Dallas, TX 75252

RECRUIT THE BEST!

Place your advertisement in regional or national editions of *Computerworld's Computer Careers* section. For more information call Lisa McGrath.

800-343-6474
(in MA, 508-879-0700)

FDSI

FDSI has represented prominent companies in the Pacific Northwest since 1982. Outstanding consulting and permanent opportunities are currently available.

CLIENT SERVER
Logical/Physical Data Modelers
Architecture Specialists
NextStep
NT/Windows 95
SQL Server
Oracle 7
Visual Basic
PowerBuilder 3.0
Visual C++/OLF/MFC

RDBMS
Oracle 7
*Forms 4
*Reportwriter or SQR
*Filenet
*Pro*C
*CASE
*Financials
*Order Entry
*C/SQL/UNIX
*Database Administrators (UNIX)
SQL Server/Sybase
*Data Modelers
*Stored Procedures/Triggers
*Visual Basic/PowerBuilder 3.0
*Database Administrators
Informix
*C/FSQL

MAINFRAME DEVELOPMENT
DB2
*Database Administrators
CICS
IMS DB/DC
Cobol/Cobol II
CSP
FDI
PL/1
VSAM
IDMS/AD5O
Banking/Finance
Retail
Healthcare
M&D, Millenium, MSA, DRW

PROJECT LEADERS/ BUSINESS ANALYSTS
Process Re-Engineering
Implementation Planning
Telephony, Healthcare, Finance
Client/Server
Legacy Systems

MIDRANGE
AS/400
*RPG II/III, Cobol
*Synon

SOFTWARE DEVELOPMENT
NT/Windows 95
Visual C++
OLF 2.0
MFC
ODBC
Excel 5
*Pivot Table
*VBA
Multimedia
*JPEG/MPEG
*Sound/Animation
C++/SQL
PowerBuilder 3.0
Unix
*C/C++
*X/Windows/Motif
*UIM/X
*Test
Windows Tester
*MS-Test
*Visual Basic
Macintosh
*4D
*MPW
*C/C++
Telephony/X.25, X.400, X.500
Progress 7
Customer Support

NETWORKING
Project Lead - LAN/WAN
UNIX Sys. Admin.
*HP-UX, AIX, SUN
*C, C++, PERL, Scripts
*Tivoli
Network Design/ Implementation
*Multiple Platform Exp.
*TCP/IP, FDDI, DN5, NFS
Network Management
*Netview, Sniffer, VTAM
Frame Relay
Technical Writer
*TCP/IP, Client/Server

Financial Data Systems, Inc.

2451 152nd Avenue NE
Redmond, WA 98052
Voice: (206) 881-6505
Fax: (206) 882-3189
Attn: Dept. 1295-C

3773 Cherry Creek N. Drive
Suite 575
Denver, CO 80209
Voice: (303) 331-6196
Fax: (303) 331-6197
Attn: Dept. 1295-C

Microsoft SOLUTION PROVIDER

EMAIL: fdsi@cert.net

Member NACCB EOE



The Monster Board™

Jobs On The Internet

More than 500 people a day view these Hot Jobs on our interactive, easy to find Web pages.

- Multi-media Specialists
- Client/Server Developers
- Database Administrators
- Programmer/ Analysts
- Senior Product Support Engineers
- Network Administrators

These jobs are just a sampling of opportunities on the board.

Apply On-Line

Your Source For **100's Of Jobs**

Key in: http://www. **monster.com**

To post jobs call: **(508) 653-7666**



INGRAM MICRO #1 again! PREFERRED DISTRIBUTOR

TECHNICAL INSTRUCTORS

Join Ingram Micro and become a Certified Microsoft Instructor

Ingram Micro — the world's largest distributor of microcomputer products — operates Authorized Technical Education Centers located throughout the U.S. Continued development of existing centers and the opening of new facilities has created immediate opportunities for Technical Instructors with the following qualifications:

- 2+ years technical experience in Novell Netware, OS/2 or Microsoft Windows NT
- Bachelor's degree or equivalent computer engineering background
- Excellent communication and presentation skills
- CNI or CNE certification preferred

The professionals who join us will be certified to teach Microsoft MCSE courses. Education centers are currently located in the following areas:

• Northern CA • Chicago, IL • New York, NY • Dallas, TX
• Southern CA • Baltimore, MD • Atlanta, GA

Ingram Micro offers an attractive compensation and benefits package, including relocation, plus the opportunity to grow with the industry leader. If you are interested in making the most of your abilities as part of the team with a tremendously bright future, please fax/mail your resume INDICATING GEOGRAPHIC PREFERENCE to:
Ingram Micro Inc., Human Resources Dept. KA/CW4020B, P.O. Box 25125, Santa Ana, CA 92799-5125. FAX (714) 566-7737.
Equal Opportunity Employer.

INGRAM MICRO

"Leading The Way In Worldwide Distribution"

Ready For A New Challenge?

We're **IMA PLUS**, the top software development firm in North Florida. We're seeking creative IT Professionals to help us define solutions for our clients in banking, finance, insurance and manufactuing.

- **INFORMIX, SYBASE or ORACLE**
- **POWERBUILDER, UNIX, C, C++**
- **COBOL II, DB2, CICS, IMS DB/DC**

If you have experience in any of the above skill sets and want to learn more about the variety of challenging opportunities at **IMA PLUS**, call or send your resume to:

Larry Williams
9428 Baymeadows Road, Suite 500
Jacksonville , FL 32256
1-800-462-1886
(904) 737-0666 (FAX)

IMA PLUS

An INC. 500 *Company*

SOFTWARE CONSULTANTS (2 positions): Responsible for working as a key member of a software development team in the design and development of a completly new underlying platform software called Merlin, to be used as a foundation software ior all Intergraph applications development groups and customers. Works under limited supervision using C and C++ programming languages in a UNIX and Windows NT operating systems environment. Implements software designs which incorporate state-of-the-art computer graphics design, processing, and interface tools. Applies knowledge of Computer or Electrical Engineering and Computer Aided Design (CAD) systems in completing assigned Merlin development projects. Applies computer software development knowledge and experience, as well as knowledge of computer graphics systems. Assists other developers and carries out product testing and implementation of product software designs. BS (minimum) in Computer or Electrical Engineering, Computer Science, or CAD with major field of study in Computer Science, Computer Engineering, Electrical Engineering or related. Two years' experience as a software consultant or two years' experience in CAD/Computer Software development for CAD applications. Competency (2 yrs. or more experience) in C and C++ programming languages. At least one year's or more experience in a UNIX or Windows NT Operating System environment. One year's or more experience in CAD applications. Minimum of 18 months in computer software development. Must be authorized to work in the United States. Resume to Marilyn Thomas, Alabama State Employment Service, P.O. Box 428, Huntsville, AL 35804-0428. Job order #AL4227408. EOE/ AA/ M/F/D/V.

DUX INTERNATIONAL LTD
London • Amsterdam • New York

NEW YEAR – NEW OFFICE

Dux International is a very successful European recruitment consultancy, with its headquarters in London. We are pleased to announce the opening of a new office in the United States. In addition to positions throughout Europe, **Dux International** has new opportunities for experienced I.T. professionals all over the USA. We are looking for expertise in the following areas:

- UNIX
- Client Server
- Relational DB's
- and many more

Please call us to discuss your future!

NEW OPPORTUNITIES

Please send your resume or call: Karin Doeksen
Phone: 212-599-6141 Fax: 212-599-7691
551 Fifth Avenue New York NY 10176

TANDEM
COBOL, PATHWAY,TAL, SCOBOL,C, SQL,X.25

STRATUS
PL1,COBOL,C,CN/2

MUMPS UNIX
SUN, HP, RS/6000, GUI, SDK Powerbuilder, C++, Visual Basic Fulltime/Consulting Positions available in the US/ABROAD

STRATEM
800-582-JOBS
TEL (212)967-2910
FAX (212)967-4205
124 W. 30th St. Suite #302
New York, N.Y.10001

Conference Call



Computerworld's Corporate Technical Recruiting Conference

Suburban Denver, Colorado

June 11-14, 1995

For more information, call 1-800-488-9204

Clip and FAX this coupon to ***1-508-620-9430*** *or call* ***1-800-488-9204*** *for more information.*

Please place my name on your mailing list so I'll receive registration materials and information throughout the year.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip Code _____

Phone _____

Fax _____

e-mail _____

CTRC

QUALITY IS OUR FOUNDATION... EXCELLENCE IS OUR REPUTATION

SPECTRUM TECHNOLOGY GROUP, INC. has been assisting clients with advanced expertise in information technology planning, integration and project implementation since 1979. The foundation for our quality reputation is a group of dedicated people – IS professionals who take pride in their work, enjoy the diversity of consulting challenges and are eager to contribute to our mutual growth.

At Spectrum we've created a corporate culture that encourages the exchange of ideas and promotes internal networking through monthly dinner meetings, in-house classes and a variety of social activities. At Spectrum, you'll have ample opportunity to develop the vision, technical skills and business savvy to meet all of your career objectives.

INFORMATION ARCHITECTURE CONSULTANTS

Industry trends such as business process re-engineering, data warehouse, and client/server computing are causing increasing demand for Spectrum consultants to serve as Data and Information Technology Architects and Enterprise Modelers.

Spectrum's reputation as a leading source of Information Technology consulting expertise has resulted in immediate project opportunities with clients in the Eastern U.S. We are currently seeking to staff engagements involving Enterprise Modeling, Data Modeling and Data Warehouse Planning and Implementation.

Barbara von Halle, Spectrum Principal, author, and respected Information Management Consultant, is leading Spectrum's initiative in emerging areas including business rule theory and tools, and the effective use of Object Orientation. We are seeking experienced professionals to contribute to our growing reputation, and participate in understanding and applying important industry trends to business opportunities.

Spectrum Data Architects must have excellent analytical and communication skills, and should know relational theory, data modeling and CASE tools. Successful candidates will be full-time employees of Spectrum and will receive full benefits and a competitive salary. Opportunities exist for local New Jersey and remote consulting assignments.

Call (908) 725-4000 today.

You may also fax your resume and salary requirements to (908) 725-9313 or mail them to: Spectrum Technology Group, Inc., Attn: Suzanne Morgan, 3421 U.S. Highway 22, Somerville, NJ 08876. EOE M/F/D/V.

SPECTRUM
Technology Group, Inc.

Spectrum People: The Paradigm For Excellence



Begin a Career with a Solid Foundation.

In 1994, Sykes Enterprises, Incorporated (SEI), increased its staff to over 1,200 technical specialists, and we're still growing! We need top-notch people in our **Boulder, Charlotte, Dallas, Kansas City, Raleigh, St. Louis and Tampa** offices covering most platforms and DP disciplines.

SEI is one of the largest professional service firms in the United States. We offer competitive salaries and a generous benefits package including major medical, dental insurance, and a 401K program.

Our current needs include, but are not limited to:

- **AS 400/RPG 400**
- **COBOL/CICS/DB2**
- **C/C++ /UNIX - WINDOWS**
- **IMS DB/DC**
- **LOTUS NOTES**
- **MVS/VM MAINFRAME**
- **ORACLE/SYBASE/INFORMIX**
- **PAs - BANKING & MORTGAGE**
- **PEOPLESOFT**
- **POWERBUILDER**
- **SMALLTALK**

- **PROGRAMMERS/ANALYSTS**
- **TECHNICAL WRITERS**

If you're ready for a new opportunity, please FAX or mail your resume to **SEI** in your city of interest: 5757 Central Ave., Ste. G, **Boulder, CO** 80301 (303) 440-6369; 6201 Fairview Rd., Ste 330, **Charlotte, NC** 28210, (704) 556-9651; 5215 N., O'Connor Rd., Ste. 1050, **Irving, TX** 75039, (214) 869-9089; 7101 College Blvd., Ste. 920, **Overland Park, KS** 66210, (913) 451-5614; 8000 Regency Pkwy., Ste. 285, **Cary, NC** 27511, (919) 460-9810; 680 Craig Rd., Ste. 105. **St. Louis, MO** 63141, (314) 567-0746; 100 N. Tampa St., Suite 3900, **Tampa, FL** 33602, (813) 273-0148. EOE.

SEI®
Solutions Through Partnerships

CONSULTING

Contract Solutions is offering long-term consulting opportunities locally and throughout the United States. Most positions pay between **$80,000-$130,000** per year.

- ◆ORACLE FINANCIALS REL 9 & 10
- ◆ORACLE DBA
- ◆X-II, MOTIF, GUI
- ◆ORACLE, MANUFACTURING
- ◆ORACLE FINANCIALS DBA
- ◆ORACLE REPORTWRITER 2.0
- ◆COBOL, DB2
- ◆DBA: INFORMIX
- ◆MVS SYS PROGRAMMER
- ◆ORACLE V.7 FORMS 4.0
- ◆VMS, SYS. ADMIN.
- ◆ACMS, C, VMS
- ◆VMS, PRO*C
- ◆IMS DB/DC
- ◆DB2 DBA
- ◆SUN, NFS/NIS
- ◆ORACLE CASE 5.0, 5.1
- ◆VISUAL C++
- ◆AS400 RPG400
- ◆UNIX, C, TCP/IP
- ◆ALPHA AXP/OSF1, C
- ◆ADABAS DBA
- ◆SAP R3
- ◆INFORMIX, UNIX, DBA
- ◆MVS, CSP, DB2

Contract SOLUTIONS

Two Keewaydin Drive
Salem, NH 03079-4875
800-998-csi 1 (2741)

603-893-6776
FAX: 603-893-4208
email csinat@mv.mv.com

CAPRICORN SYSTEMS, INC.

Atlanta's Fastest Growing Consulting Firm

Quality is not an accident. It is the combination of knowledge, hard work, and commitment. CSI's approach to quality enabled it to become one of the fastest growing consulting companies with 300% annual growth and offices in Atlanta, DC, and San Francisco. We invite you to become part of this exciting growth.

Immediate openings nationwide:

- C++, Sybase
- Sybase DBA
- Sybase/PowerBuilder
- Windows NT, SQL Server DBA
- Analyst/Data Modeler Excelerator
- VAX/ACMS/ RDB/C
- Cellular Billing
- VSAM/COBOL to Sybase Client Server
- Case Analyst/ADW
- Unix C Telephony
- Unix System Admin.
- Oracle CASE
- Oracle DBA
- Oracle/ PowerBuilder
- CPCS/SMP

Capricorn offers exceptional career opportunities, medical insurance, 401K plan, paid vacations, and relocation assistance.

Mail/Fax resumes to:

Capricorn Systems, Inc.
7 Dunwoody Park, Suite #109
Atlanta, GA 30338
(404) 399-6789, FAX (404) 399-7789

PRODATA INC.

Portland, OR
Salt Lake City, UT

As One of the West's premier IS Consulting Service firms, We Offer:

• Career Growth • Excellent Compensation • Loaded Perks • Continuing Education • The Challenge of Diversity • Fortune 500 Clientele • Outstanding "Quality of Life" • A Decade of Sustained Growth • Relocation Assistance

We Need:

COBOL, CICS, IMS/DB2, IDMS/ADSO, ASSEMBLER ... OOP (Powerbuilder, Visualbasic, Windows/SQL, C++) ...RPG/SYNON/JDA ... ORACLE (FORMS, C) ... VMS/RMS ...CASE ... PROGRESS ... INFORMIX ... Data Architects/Modelers

PRODATA
4800 S.W. Macadam
Suite 309
Portland, OR 97201
(PH) 503-223-3508
FAX 503-223-7918

PRODATA
1100 E. 6600 S.
Suite 200
Salt Lake City, UT 84121
(PH) 801-266-6138
FAX 801-266-0069

DATA AID, INC.

People Who Know Computers
"A premiere consulting & contracting company"

Immediate openings in Birmingham, AL, Atlanta, GA and surrounding cities:

- COBOL, IMS, DB2, CICS
- UNIX, C, C++
- Lotus Notes
- Smalltalk, GUI, OO
- Banking or ATM exp.
- VAX, Fortran
- X-Windows
- Sequal Windows
- VAX, VMS, COBOL
- Visual Basic
- ASI on AS400
- Peoplesoft Technicians
- MVS, C
- SAP
- All-in-one

Please fax or mail resumes to:
1855 Data Drive, Suite 155
Birmingham, Alabama 35244
fax: 1-205-987-1014
Phone: 1-800-987-8878

INFORMATION SYSTEMS PROFESSIONALS

Logicon Fourth Generation Technology (Logicon 4GT) is a leading custom software developer and systems integrator specializing in business and financial applications. We are expanding in our Denver, San Diego, St. Louis, and Washington DC offices and have openings for **Programmers, Systems Analysts,** and **Network Engineers.**

Candidates must have a bachelors degree and experience in software development and/or analysis. Experience in one or more of the following areas is also required:

- Client/Server Information Systems
- Visual Basic, Oracle, Visual C++
- CASE Tools
- Business/Financial Applications
- Information Engineering/Facilitation
- LAN Administration (Novell)

As a Logicon 4GT employee, you will join a progressive, exciting company dedicated to developing business solutions with leading edge technology. We offer a full range of benefits and a competitive compensation plan. If you have what it takes to succeed in a challenging environment, we want to hear from you. Please forward your resume to:

Logicon 4GT
8910 University Center Lane
Suite 600
San Diego, CA 92122

An EEO Employer
M/F/D/V
US Citizenship Required

Or fax to (619) 587-0815. Please indicate position and location of interest.

LOGICON

Fourth Generation Technology

PROGRAMMER ANALYST (2 openings) (Ref: 12595) to consult with clients to ascertain & define their business requirements or problem areas & utilize technical expertise to provide solutions to clients' needs; analyze, design, develop & implement computer software for clients, EDP systems; design & develop an Oracle Application on Unit Sun Sparc environment & on PC based platform; study & analyze Multics based Light Truck Durability Testing Package & Incorporate the functionality of its modules in the LTDTS Application with enhancements. System testing is included with proper test plan; administrating the production Database & Application & improvement of the system as per the customer feedback using SunSparc 10 Unix system, DOS & Oracle 7.0 Version with its latest Tools as SQL*FORMS 4.0 & Oracle Case; Unix O/S with C as language & Oracle as Database; Reqs. Bach. in Comp. Sci., Computer Information Systems, Computer, Electrical or Electronic Engineering, Systems Analysis or its equiv. & 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, System Programmer, Programmer/Analyst, Software Engineer, Senior Engineer (Systems) or Consultant. Will accept 3 yrs. college ed. plus 3 yrs. exp. in job offered or related occup. in lieu of req'd ed. & exp. Must have some related exp. using each of the following: SQL*forms, Unix, C & ORACLE platform $48,000/yr. 40 hr/wk., 8:30a-5p.

PROGRAMMER ANALYST (2 openings) (Ref: 11995) to consult with clients to ascertain & define their business requirements or problem areas & utilize technical expertise to provide solutions to clients' needs; analyze, design, develop & implement computer software for clients' EDP systems; Lead a team of programmers in the analysis, design, code, test & implementation stages of application systems development. Use "C" programming language & the UNIX environment - the language development tools, the standard subroutine library, the system call interface, the text formatters & shell programming; INFORMIX Relational Database Management Systems, 4GL programming, ESQL/C & COBOL language, mini computer environment & Client/Server environment. Reqs. Bach. in Comp. Sci., Computer Information Systems, Computer, Electrical or Electronic Engineering, Systems Analysis or its equiv. & 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, Systems Programmer, Programmer/Analyst, Systems Analyst, Software Engineer, Information Technology Engineer or Consultant. Will accept 3 yrs. college ed. plus 3 yrs. exp. in job offered or related occup. in lieu of req'd ed. & exp. Related exp. must include software and system development, & using each of the following: COBOL, C, UNIX, INFORMIX-4GL & ESQL-C. $46,800/yr. 40 hr/wk., 8:30a-5p.

PROGRAMMER ANALYST (2 openings) (Ref: 12095) to consult with clients to ascertain & define their business requirements or problem areas & utilize technical expertise to provide solutions to clients' needs; analyze, design, develop & implement computer software for clients' EDP systems; Lead Analyst for analysis, design & development of an integrated welfare system. Process flow, data flow design, date modeling, technical support & overall design of Data Caseload Management module of the system, meeting with users to gather requirements. Technical support for design of applications using IMS-DC, DB2 on IBM 3090 hardware under MVS/ESA Operating System in language VS COBOL II. Development environment will be PC based using TELON, AD/MVS, MF COBOL workbench & XdB. Also using case tool ADW, TSO & JCL; Reqs. Bach. in Comp. Sci., Computer Information Systems, Computer, Electrical or Electronic Engineering, Systems Analysis or its equiv. & 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, Systems Programmer, Programmer/Analyst, Systems Analyst, Software Engineer or Consultant. Will accept 3 yrs. college ed. plus 3 yrs. exp. in job offered or related occup. in lieu of req'd ed. & exp. Must have some related exp. using each of the following: DB2, MVS/ESA, VS COBOL II, TSO, ADW & JCL $43,000/yr. 40 hr/wk., 8:30a-5p. Send resume to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #. Employer Paid Ad.

Programmer/Analyst

Analyze, design, code, test & implement software systems for wholesale distribution organization. Requires bachelor's degree in CS or IS, and 3 years experience in development of distribution and Accounting systems using COBOL, C, C++, or Progress. Interstate is the world leader in replacement batteries. Located in Dallas, we offer an excellent opportunity for exposure to leading edge technology such as Progress, Windows NT, and running in a DEC Alpha/OSFI environment. Send your resume to **Interstate Batteries, 12770 Merit Dr., Suite 400 Dallas, TX 75251. Attn: JB or fax (214) 458-8288.**

PROGRAMMER

Florida's first public Community College needs person for an exciting high profile rightsize operation from mainframe to AS/400 with enabling technologies. 2 years experience with NATURAL and CONSTRUCT. COBOL, MVS, and/or AS/400 experience desired. Develop, and implement new applications using NATURAL, CONSTRUCT, and other Software AG tools. Application closing date 1/31/95. Send letters/resumes to **Manager, Employment, Human Resources, PALM BEACH COMMUNITY COLLEGE, 4200 Congress Avenue, Lake Worth, FL 33461**
An EO/AA/VP Employer

HEALTHCARE IS CONSULTING OPPORTUNITIES

Multimillion dollar consulting firm seeks full-time Consulting Professionals to enhance our Information Systems consulting practice. Positions require strong technical background including:

- **Medipac/HBO • SMS**
- **Strategic Planning**
- **Disaster Recovery**

Competitive salary and benefits. Interested candidates should submit resume in confidence to NAS CONFIDENTIAL REPLY SERVICE, Suite 1740, Three Gateway Center, Dept. 1PG042, Pittsburgh, PA 15222. AA/EOE.

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

For over two decades, Computerworld has delivered qualified job candidates to America's employers.

And ever since Computerworld's first weekly issue in 1967, America's companies have relied on *Computerworld* to target America's most qualified computer job candidates.

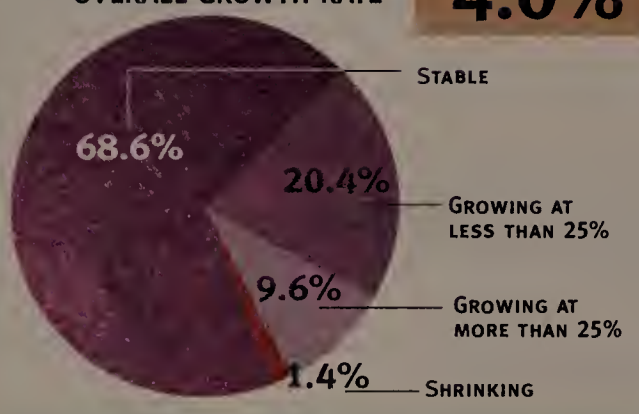
To place your ad regionally or nationally, call John Corrigan, Vice President Recruitment Advertising, **at 1-800-343-6474; x 201 (in MA, 508/879-0700).**

COMPUTERWORLD

CAREER SURVEY: Factory Automation

INDUSTRY HIRING TRENDS

OVERALL GROWTH RATE **4.0%**

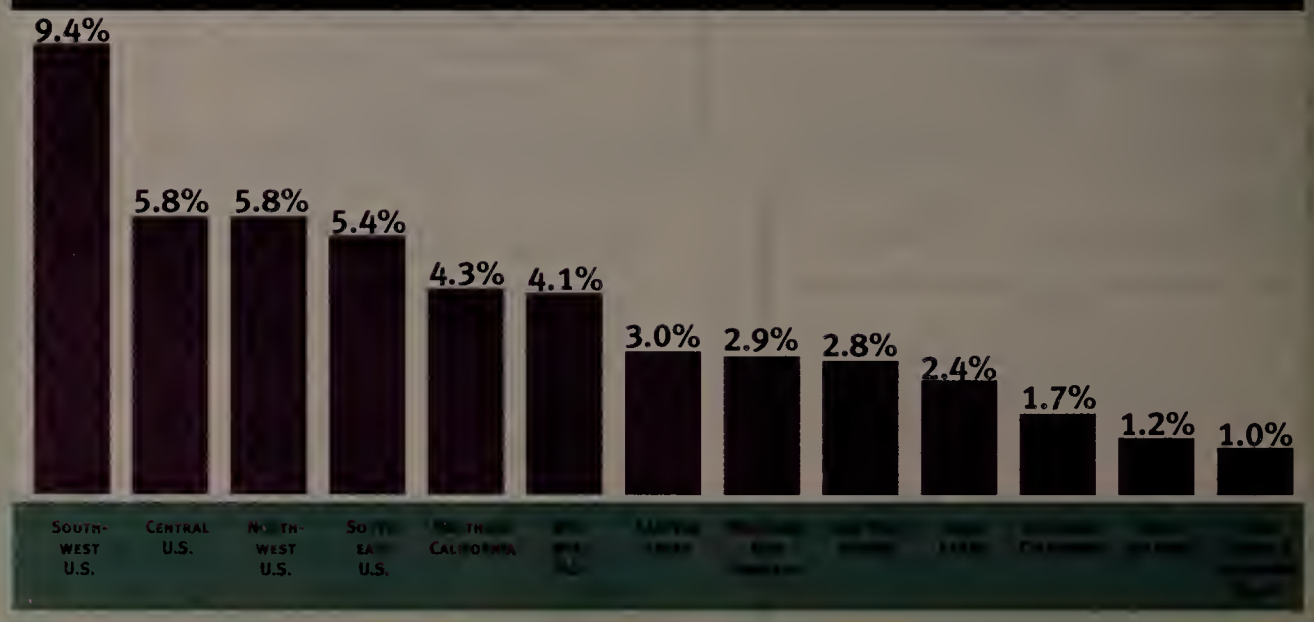


SURVEY BASE: 280 TECHNOLOGY FIRMS INVOLVED IN FACTORY AUTOMATION

SURVEY CONDUCTED BETWEEN OCTOBER '94 AND DECEMBER '94;

© Copyright 1994, Corporate Technology Information Services, Inc., Woburn, Mass.

REGIONAL GROWTH ANALYSIS



CORPTECH, A DIRECTORY PUBLISHER IN WOBURN, MASS., TRACKS THE U.S. 35,000 TECHNOLOGY MANUFACTURERS. THIS SURVEY RELATES TO THE 28,437 TRACKED FIRMS WITH FEWER THAN 1,000 EMPLOYEES.

MIRROR on the wall MIRROR

In 1995, buyers will see value-added resellers test new technology waters. The same caveats exist, however. Do business with established and financially stable shops.

By Alan Radding

Value-added resellers (VAR) are hot. That's the word from analysts.

Long dismissed as poor cousins in the computer industry because of their small size, marginal financing and questionable staying power, VARs are suddenly attracting attention.

They're being flagged as part of an emerging group of niche players that will play an increasingly important role in the overall competitive picture.

The rise in VAR prospects, suggests Jeffrey Kaplan, director of research at Dataquest Worldwide Services Group in Framingham, Mass., stems from the growing complexity of technology and the need for flexible, nimble organizations that work closely with customers.

No longer just box pushers offering turnkey systems built around aging software, the best VARs put themselves in the forefront of technology but not at the bleeding edge, notes Jeffrey Geibel, managing partner at Geibel Marketing Consulting in Belmont, Mass. "VARs need to see market interest in a technology," he says.

"VARs are not early adopters," says Gene Bledsoe, partner at Casal Group Corp. in Dallas. When leading-edge technology matures to the point at which it can be turned into an effective solution with identifiable business value, VARs will jump on the new technology.

Due to a VAR's specialized nature — each has its own particular vertical or horizontal market focus — what is an emerging technology for one may be old hat or too far out on the edge for another.

Below, VAR consultants predict what's hot and what's not for VARs in 1995. But general talk of what's hot and what's not means little to individual VARs. They need to take their cues from their target market. Somewhere there are VARs still making a healthy living replacing aging minicomputer-based systems with PC and Unix LANs or providing dBase applications, all of which are mature technologies. ■

Radding is a free-lance writer in Newton, Mass.

Vertical variances

The hot technologies for VARs will vary from market to market. Here is the 1995 technology view from three areas.

Manatron, Inc. in Kalamazoo, Mich., serves state and local governments. Company President Allen Peat identifies the hot technologies as bar coding; systems that extend beyond in-house systems to integrate with customers and partners; geographical information systems integration; groupware; and remote/wireless computing.

CompuLand Business Systems in Andover, Mass., specializes in sales automation. President Mark Engelberg identifies wireless communication; videoconferencing, if the price is right; and computer-integrated telephony, if customer demand materializes.

Workflow Designs in Dallas is a Notes VAR specializing in the oil/gas, health care and pharmaceutical industries. Co-founder Clark Fletcher identifies stored digital video; computer-integrated telephony; integration hooks for Notes into third-party databases; and imaging for small applications.

WHAT'S HOT

ISDN AND CABLE TV MODEMS. This will be the year that VARs jump on the Integrated Services Digital Network (ISDN) bandwagon to add high-speed, low-cost connectivity to their solutions, predicts Mark Cuban, president of Radical Computing, a VAR consultancy in Dallas. Cuban says the cable TV network will be another way for VARs to offer high-speed connectivity.

VIDEOCONFERENCING. The widely heralded convergence of the computer and the telephone will become a marketable solution this year, Casal Group's Gene Bledsoe says. Moreover, Personal Technology Research in Waltham, Mass., projects that the market for PC-based videoconferencing will hit $120 million in 1995 and $2.1 billion by 1998. Cuban, however, urges caution. "Videoconferencing is a lot like pen computing," he says. "It is highly touted, but it is not revolutionary. It is going to be a niche product."

MOBILE/WIRELESS COMPUTING. Products, networks, standards and pricing for mobile computing are falling into place. "We'll see real product capabilities in 1995," Bledsoe says. Consultant Jeffrey Geibel adds, "VARs will see this as an enabling technology for sales force and field service automation."

THE INTERNET. The much-ballyhooed information superhighway will remain hot in 1995, and VARs that can help customers set up Web and other online servers will find themselves in great demand, Cuban says.

WHAT'S NOT

For some technologies, the ship may have left the dock already or has not even arrived:

GROUPWARE. "It has already happened. If a VAR is just getting into groupware now, then it is too late," says consultant Mark Cuban. Lotus Development Corp. has expanded its VAR base from 200 VARs to more than 6,000 VARs, according to recent estimates, leaving little room for newcomers. Still, the arrival of new groupware players such as Mesa Group, Inc. in Newton, Mass., and Collabra Software, Inc. in Mountain View, Calif., and Microsoft Corp.'s expected entrance late next year suggest more opportunities.

IMAGING. "Some VARs have been doing this for years," says Jeffrey Geibel, a consultant at Geibel Marketing Consulting. Any opportunities remaining here will be in specialized, image-enabled vertical market applications.

MULTIMEDIA. "There's not much of a product for a VAR," Casal Group's Gene Bledsoe says. Geibel agrees that other than for training, multimedia doesn't offer much for VARs. Cuban dismisses it as a niche product with little widespread appeal.

ASYNCHRONOUS TRANSFER MODE. This high-speed wide-area network protocol won't be ready for prime time in 1995, "but it will be very important down the road. Now is the time for VARs to learn it before they need it," Cuban says.

Network Management Tools



FILEAUDITOR® TELLS ALL!

WHO GOT INTO WHAT FILES, WHEN?

FileAuditor enhances your network security by...

- Tracking file and directory activity on the network.
- Having proactive network security with NLMAuto or NLMerlin
- Denying access to specific files.
- Generating custom reports.

If you need enhanced network security

Call: 1-800-333-8698

FAX: (602) 545-0008

Knozall Systems, 375 E. Elliot Rd, #10 Chondler, AZ 85225

A Division of Tangram Enterprise Solutions

Knozall

Networking Management



WHEN A WARM BOOT DOESN'T WORK... THERE'S ALWAYS THE IPS-110

- Remote power cycle 1 to 1,024 devices from single line
- User ID/Password Security, with device database
- User programmable power sequencing
- Dial-Back: individual power loss, temp, UPS on battery
- VT100 Emulation,2400 Baud built in modem
- Internal battery backup
- Current verification on each device
- 30 Day Money Back Guarantee, One Year Warranty



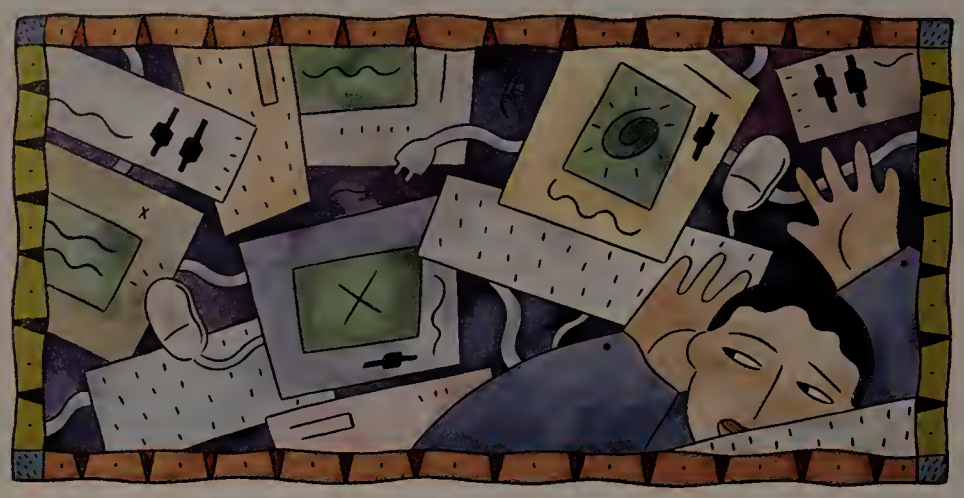
FOR A PERSONALLY GUIDED DEMO CALL:

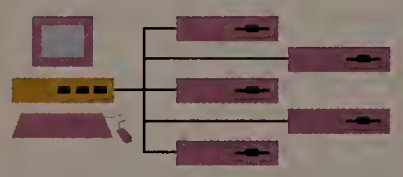
1-800-776-4346

LodeStar Technologies Inc.

Networking Hardware

SUFFERING SERVER SQUEEZE?





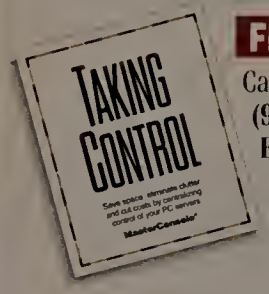
MasterConsole eliminates keyboard and monitor clutter!

Managing multiple servers?
MasterConsole can give you rock solid, reliable control of 2 to 64 PCs from a single keyboard, monitor and mouse. So give yourself some breathing room. Call today for our free information kit.

1 YEAR WARRANTY

30 DAY MONEY BACK





FREE!

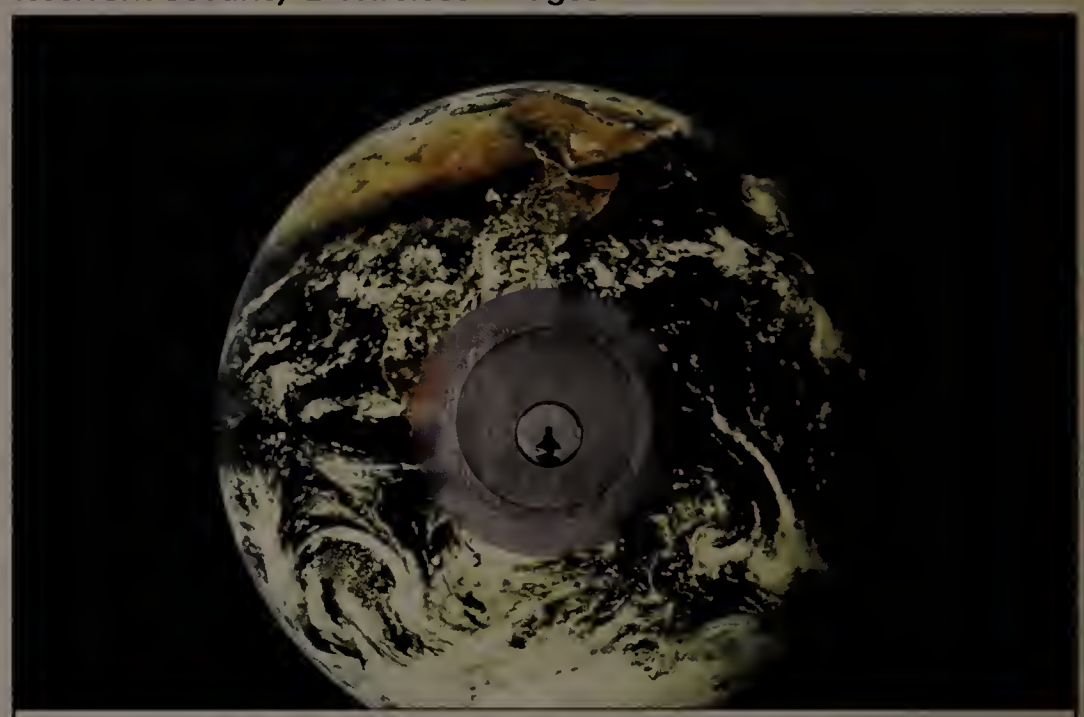
Call **(908) 874-4072, Ext.52,** today for our information kit!

MasterConsole®

Raritan Computer, Inc.
10-1 Ilene Court, Belle Mead, NJ 08502
FAX (908) 874-5274

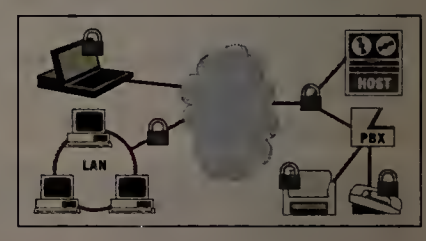
RCI®

Network Security & Wireless Bridges



Cylink has the world locked up.

You *can* secure your information globally. You just need the right security partner. Only Cylink has spent the last ten years building a support organization in over 80 countries—working successfully with local governments, customs, and communications infrastructures. We can secure everything from applications on a laptop to global wide-area networks, from telephones to high-speed data links. We secure information for most of the world's money center banks, Fortune 500 companies, and government, police, and military organizations. Because of our experience, it's easier than you think to keep your information safe. Cylink Corporation, 910 Hermosa Court, Sunnyvale, California, USA, 94086. Telephone: 408-735-5800, FAX: 408-720-8294, Toll-free (USA): 800-533-3958. Worldwide sales & support.



FAX INFO: 800-833-9137 ext. 63.

England: Cylink, Ltd., Hampshire—TEL: +44-256-841919 • FAX: +44-256-24156
Singapore: Cylink Corporation—TEL: +65-336-6577 • FAX: +65-334-1429
© 1994 Cylink Corporation. Cylink is a registered trademark of Cylink Corporation.

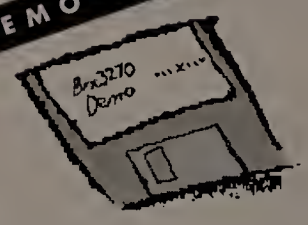
CYLINK

Mainframe Connectivity

How to connect

FREE!

NEW Brx3270 DEMO DISK



3270 SNA Emulation Software for Windows™

Access IBM mainframe applications from your PC.

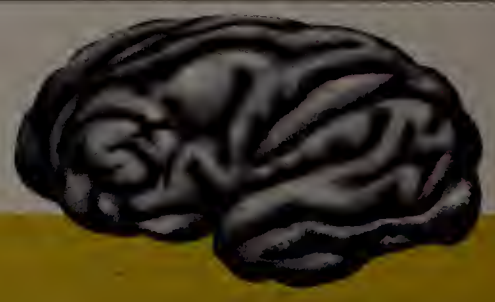
- 3270 and Telnet 3270 clients for Windows 3.1
- File transfer and print
- Point & click programming
- 100% Winsock-compliant
- Graphical keyboard mapper
- Allows interactive query of applications like TSO, CICS, IMS, and NetView

CALL 1-800 BRIXTON

CNT/Brixton Systems, Inc.

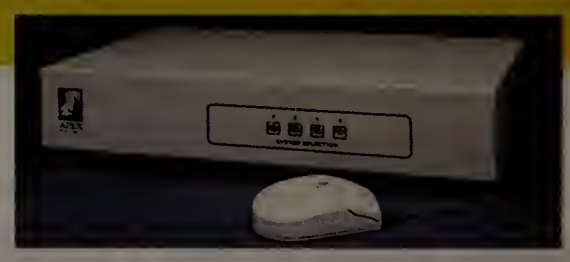
MARKETPLACE

File Server Concentration



The world's two best switching systems.

The APEX Desktop Concentrator



4 and 8 port models

The smartest way to reliably attach and control a vast network of computer systems using a single keyboard, mouse and monitor.

Intelligent operation maintains connections across up to 64 computer systems without costly expansion modules or expensive custom cables. Ensures unattended system restart after power failures.

Knowledgeable support. Apex's decade of experience with system integration enables you to dramatically boost efficiency and productivity.

Innovation & Technology by Design

Made in U.S.A.

For more information call: 1-800-861-5858
4580 150th Avenue NE • Redmond, WA 98052 • Fax: 206-861-5757

APEX PC SOLUTIONS

Computer Presentations

Three for the show.

An Inc. 500 Company



Affordable color! Our most popular product just got even better. Better wall-sized true-color projection at the same unbeatable price. The BOXLIGHT ColorShow 1200 is our best seller for a good reason - value!

BOXLIGHT 1200. $2,299

- 24,389 vibrant colors
- Universal PC and Mac compatibility
- Compact, portable design
- FREE remote control and cables
- Brightest color at any price
- Now with faster mouse response!

BOXLIGHT 2100. $6,299

All-in-one! Convenience is the key with the new BOXLIGHT ProColor 2100 integrated LCD projector. Outstanding brightness without the need for an overhead projector. Built-in video AND audio for true multimedia. Automatic dual-lamp changer means the show always goes on. A high-performance solution at a tremendous introductory price.



- 16.8 Million colors!
- Built-in video convertor
- Built-in audio amp & speaker
- Optional wide-angle lens
- FREE Remote control & cables



Price Performance! Over 600,000 colors and built-in audio make your presentations and meetings come alive with wall-sized video and room-filling sound. Super-fast response times, VESA Local bus video compatible. Need we say more?

BOXLIGHT 1500. $3,799

- 16 million colors, 600K simultaneously
- Built-in audio amp & speaker
- Rugged, lightweight metal case
- Projects from PC, Mac or VCR
- Model 1300 without video/audio - $2,999!

BOXLIGHT: Your direct source for all the bright answers.

- More than 50 models in stock
- Instant availability
- Overnight shipping
- 30-day guarantee and extended warranties
- Expert technical support

No one else offers the one-stop shopping...the selection... the value...the immediate delivery... and the knowledgeable service and support you get from the projection panel experts.

The Inc. 500 logo is a registered trademark of Goldhirsh Gr Inc.

BOXLIGHT™ CORPORATION

17771 Fjord Dr. N.E., Poulsbo, WA 98370 • 206/779-7901
Payment: VISA, MasterCard, American Express, COD and Purchase Orders (some restrictions). Leasing and rental options available. 30-Day Money-Back Guarantee.

Call today 1-800-762-5757

Security

Kāblit™ Security

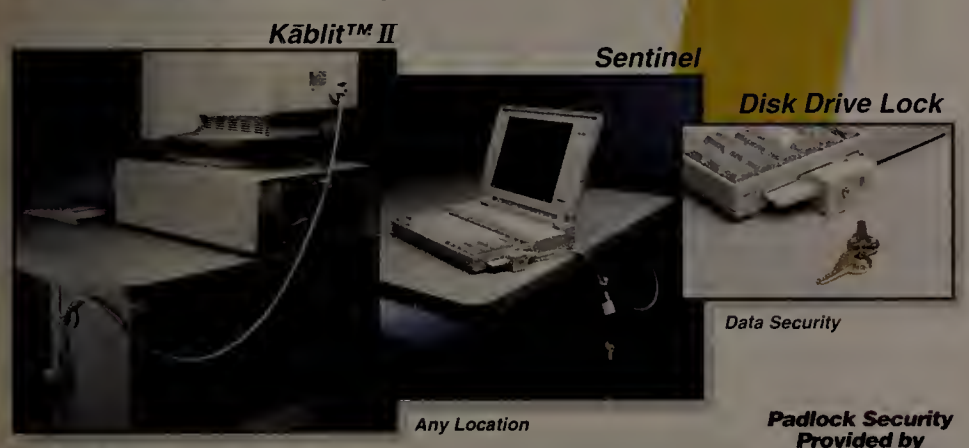
NOW!

STOP COMPUTER THEFT

IN THE OFFICE — ON THE ROAD

- Secure computer or notebook to desk, table, etc.
- Lock disk drive — Protect data
- Lifetime warranty

$24.95 to $49.95 Retail Price



Padlock Security Provided by Master® Lock

Quick and Easy to Install!
Compact — Lightweight!
Available For Macintosh Computers Too!

Order Now — Call 800 - 451-7592

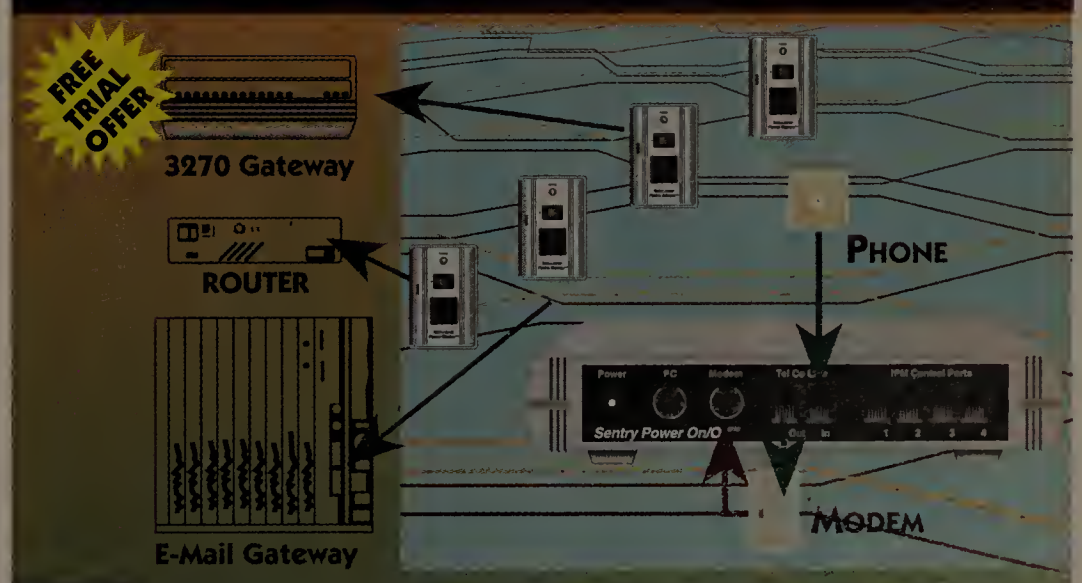
Secure-It

18 Maple Court, East Longmeadow, MA 01028

The particular Master Lock Trademarks used are trademarks of the Master Lock Company and are used by Secure-It, Inc. under license.

Networking Management

LOCKED-UP ROUTERS & OTHER WAN DEVICES USING THE SENTRY REMOTE POWER MANAGER



Re-Boot

Using an ANSI emulator, a network administrator, calls the sentry, enters a password and receives an on screen menu. From the menu individual ports can be toggled "power-off or power-on" to re-boot locked-up mission critical network devices. The Sentry supports 4 companion power modules which control the AC power flow to each network device.

When your remote Router, Modem, Gateway or, Access Server gets locked-up RE-BOOT IT using the Sentry Remote Power Manager.

Sentry provides password secure power on/off REBOOT control to geographically distant network devices

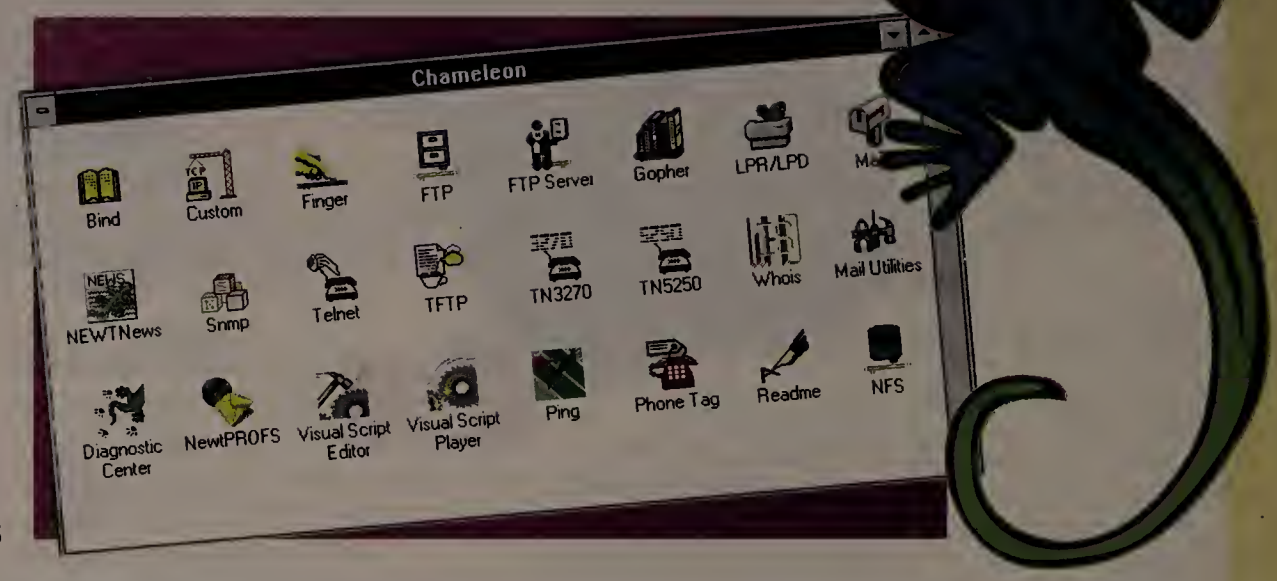
Call for info or a Free Demo Disk
800-835-1515 U.S.

Server Technology
1292 Hammerwood Ave
Sunnyvale, CA 94089
408-745-0[illegible]
Fax 408-745-0[illegible]

Connectivity Software

TCP/IP Applications For Windows.

Network Your PC To The World With Chameleon.



BEST VALUE
Chameleon offers more applications than any other product, providing a comprehensive Windows solution for TCP/IP networking.

SEVEN INTEGRATED SUITES
Terminal emulation, e-mail, file and printer sharing, remote access, network utilities, administration tools, and an easy point-and-click interface into the Internet.

SEAMLESS ACCESS TO OTHER HOST SYSTEMS More applications are included that allow you to access information on Unix mainframes, minicomputers, PC-based LANs and WANs, and the Internet.

OFFICE, HOME, AND REMOTE NETWORK ACCESS
Connect to your network and the Internet via LAN or dialup access with one easy-to-use software package.

Chameleon includes WinSock TCP/IP and is 100% DLL. It requires only 6KB memory and 5 minutes to install.

APPLICATIONS INCLUDED:

- Terminal Emulation
  - Telnet: VT100, VT200, TVI, TN3270, TN5250
  - Visual Script Editor & Player
- File Transfer
  - FTP Client & Server
  - TFTP
- File & Printer Sharing
  - NFS Client & Server
  - LPR/LPD
- Electronic Mail
  - SMTP Mail with MIME
  - Phone Tag
  - IBM PROFS
  - POP2, POP3, SMTP
- Internet Access
  - Gopher
  - Newsreader
  - Whois
- Network Utilities
  - Ping
  - Finger
  - Diagnostic Center/Trace Agent
  - DNS Client & Server
- WinSock TCP/IP
  - 100% DLL TCP/IP Stack
  - Windows install and setup
  - LAN: Ethernet, Token Ring
  - Dialup: SLIP, CSLIP, PPP & ISDN

MICROSOFT® WINDOWS™ COMPATIBLE · yes NetWare Tested and Approved · Sept.1994 · Sept.1994 · Sept.1994

© 1994 NetManage Inc., 10725 North De Anza Boulevard, Cupertino, California 95014, U.S.A. Fax: (408) 257-6405. Specifications are subject to change without notice. All trademarks are property of their respective companies.

NETMANAGE™
(408) 973-7171
e-mail: sales@netmanage.com
World Wide Web: www.netmanage.com

Computer Presentation

Power Tools for the Power Presenter

One stop shop for all major brands



For the latest in color projection panels and projectors call the experts in LCD technology. Your satisfaction guaranteed or your money back. Quick delivery via Fed-X or UPS.

Call for CATALOG 1 800 726 3599

Panelight DISPLAY SYSTEMS, INC.
101 The Embarcadero Ste. 100-A, San Francisco, CA 94105
Hours: 6:30 to 5:30 PST, 9:30 to 8:30 EST
VOICE: 415 772 5800 FAX: 415 986 3817

Object-Oriented Development

This ain't no bit-tweaking, candy-assed OO tool.



Introducing ObjectPro. The only OO tool that lets you develop high-performance, visual applications without low-level programming.

Supreme productivity. ObjectPro gives you the same flexibility, tools and power of C++ and Smalltalk *plus* powerful editors, browsers and debuggers. Just point, click and move on.

Ultimate object reuse. ObjectPro lets you assemble applications from custom class libraries, industry-standard controls, third-party solutions, or your own components to spin applications in record-breaking time.

Trinzic

Call 1-800-234-7724 today for a FREE ObjectPro 30-day evaluation.

Trinzic Corporation, 101 University Avenue, Palo Alto, CA 94301. Voice: 415-328-9595, Fax: 415-321-7728, E-mail: objpro@trinzic.com
ObjectPro is a trademark of Trinzic Corporation. All other trademarks are the property of their respective companies.

CW1/2

MARKETPLACE

► See us at COMNET booth 616

Hubs



We've Taken Enterprise Connectivity Beyond Virtual Reality.

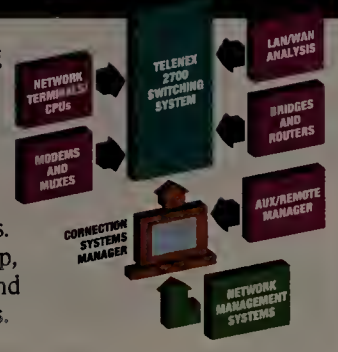
LAN and WAN Connectivity Management in One "Super Hub"

With a Telenex 2700 LAN/WAN Super Hub Switching System, you get any-to-any LAN and WAN connectivity control for mid- to high-end networks. With point-and-click simplicity, you can quickly change Token Ring, Ethernet, and WAN port connections from a centralized controller.

Set up and modify logical workgroups. Segment rings. Reconfigure links between modems and FEPs. Add, drop, or reposition workstations. Share or spare processors and peripherals. Manage high-speed backbone or VSAT links. Or distribute test access and monitoring.

Add integrated LAN/WAN diagnostics, along with TCP/IP and SNMP gateways, and you have an unbeatable management system.

Evaluate a 2700 LAN/WAN Super Hub Switching System yourself. Call today.



WorldCLASS Quality ISO 9001

1-800-222-0187

TELENEX CORPORATION
A UNIT OF GENERAL SIGNAL

Telenex Corporation • 13000 Midlantic Drive • Mount Laurel, New Jersey 08054
Phone: 609-234-7900 • Fax: 609-778-8700

Buy / Sell / lease

BUY • SELL • LEASE • RENT

IBM Systems • Peripherals • Parts & Service

SPECIALIZING IN:

- RISC System/6000®
- Workstations
- Parts & Features
- AS/400®
- Novell Networking
- Sun & Dec
- Personal Computers
- Data Communications
- UPS Systems
- Peripherals & Upgrades
- System 36 Conversions
- AutoCad

NEW & USED IN STOCK

Complete Technical Center, Installation, Stock Parts & Features for RISC.

Authorized Distributors for: **Seagate • Xerox Kingston • Cal Comp Motorola • UDS/Codex Decision Data Products**

8 Nationwide Locations

A Publicly Traded Company NASDAQ: MKPL

Computer Marketplace prides itself on being your one-call computer hardware solution.

COMPUTER MARKETPLACE

800-858-1144

TEL (909) 735-2102 • FAX (909) 735-5717
1490 Railroad Street • Corona, CA 91720

® IBM Trademark
asap CDLA CBE

Large Systems Computers & Peripherals

Buy / Sell / Lease

IBM

- ES/9000
- SERIES/1
- AS/400
- RS/6000
- SYSTEM/88
- Point Of Sale
- ...and more!

New & Used

- *Computers*
- *Peripherals*
- *Upgrades*

Buy • Sell • Rent • Lease

amdahl
Cisco
Concurrent
Data General
digital
Hitachi
HEWLETT PACKARD
Memorex-Telex
Prime
Silicon Graphics
Stratus
Sun
TANDEM
TEXAS INSTRUMENTS
UNISYS
XEROX

SPECTRA
(800) 745-1233
(714) 970-7000 • (714) 970-7095 Fax

Anaheim Corporate Center
5101 E. La Palma Ave., Second Floor
Anaheim, CA 92807

Dempsey: Where IBM® Quality is Second Nature!

- AS/400
- INDUSTRIAL PC
- RS/6000
- SYSTEM/36
- SERIES/1
- 9370
- ES/9000
- PS/2 & VP

Sales & Rentals
- Processors
- Peripherals
- Upgrades

For pretested equipment, flexible financing, configuration planning, technical support and overnight shipping call.

Dempsey BUSINESS SYSTEMS
18377 Beach Blvd., Suite 323 • Huntington Beach, CA 92648
(714) 847-8486 • FAX (714) 847-3149

IBM Authorized Distributor Products Integrator

IBM is a registered trademark of International Business Machines Corporation.

(800) 888-2000

Computer Products

1995 COMPUTER SALE

AST Power Exec 386S/ 25Mhz 2MB/ 80 MBHD	$675
AST Power Exec 386S/ 25Mhz 4MB/ 120 MBHD	$795
AST Advantage Explorer 486SX/25 Model 173/4/170/Mono/DOS/Win 3.1 Fax/Modem (P/N 501262-003)	$925
Compaq SLT 386S/ 20Mhz 2MB/ 60 MBHD	$595
Compaq SLT 386S/ 20Mhz 2MB/ 120 MBHD	$695
Compaq Contura 486SL/25/4 120/1 44 FDD/9600/2400 Fax Data Modem Trackball/VGA Mono/DOS 6.0/Win 3.1 PFS Windows Works	$930
NCR 3150 486SX/25/4/120 Active Color *(New)*	$1795

Apple Macintosh Specials

Mac Performa 600 68030/33Mhz/5/160 CD-ROM/.29 Color Mon.	$1075
Mac Performa 466 68040/33Mhz/4/160 29 Color Mon.	$875
Mac Performa 475 68040/25Mhz/4/160 No Monitor	$785
Mac Performa 550 68030/33Mhz/5/160 CD-ROM/ built in Color Mon.	$1075
Powerbook 540C 4/320 (New)	$3985
Power Mac 7100 8/500 M3589LL/B (New)	Call
Power Mac 7100 16/500CD M2836LL/C (New)	Call
Power Mac 8100 8/500 M3587 (New)	Call
Power Mac 8100 16/500CD M2284 (New)	Call

All Apple systems are factory refurbished and include a 90 day parts & labor Apple warranty, standar keyboard, all cables, manuals & software.

Apple Compatible Printers

HP Deskwriter C (30 day warranty)	$275
HP Deskwriter 520 (30 day warranty)	$229

AST Desktops

Advantage Adventure 486SX/1MB Local Bus Video/16 bit sound blaster card/MM dual speed CD ROM/dual speakers/microphones/SVGA color/DOS 6.21 (P/N 501276-002)

25 Model 173/4/170	$895
33 Model 173/4/170	$925
33/4/210	$1045

Advantage Pro 486DX2/50 Model 348/4/340/1MB Local Bus Video SVGA color/Dual FDD/Fax/Modem (P/N 501416-001) $1095

Add a multisync AST 4L monitor for $100.00

Compaq Desktops

Prolinea CDS, 486SX/25/4/118 CD ROM/Speakers/Microphone/Fax/Data Modem/1.44 FDD/Color .28 SVGA/S/W	$890
Prolinea 4/25S 486SX/25/4/118/1.2&1.44 FDD SVGA color/9600/2400 Fax/Data Modem/Mouse DOS 6.0/Win 3.1/America Online/Quicken Tab Works/PFS Windows Works/Prodigy	$825
Presario 425 486SX/25/4/207/1.44 FDD/Fax Data Modem/SVGA Color/Software	$825
Presario 850 486DX2/50/4/263/1.2&1.44 9600/2400 Fax/Data Modem/SVGA color DOS 6.0/Win 3.1/MS Works/Winfax Lite Tabworks/ MS Publisher	$1150

Monitors

20" Radius for Mac	$995
20" Super Match for Mac	$995
16" IBM 8515 SVGA	$195

NC3™

TEL: 315.438.4400
FAX: 315.438.4213

National CommodityClearance Center, Inc. 6619 Joy Rd., E. Syracuse, NY 13057

Equipment carries a 90 day back-to-depot warranty. Call for complete inventory list. Equipment is subject to prior sale, pricing may change without notice. This ad could contain technical inaccuracies or typographical errors. FOB Syracuse. Visa, COD Cash, or Prepaid. Authorized returns of products for refund are subject to a 20% restocking charge and are limited to 15 days from invoice date.

Outsourcing / Remote Computing

ALICOMP, INC.

The "Boutique" of the Computer Services World

Outsourcing Remote Computing

VM, MVS, VSE

Two State of the Art Locations:

ALICOMP / CBS

20,000 sq. ft. Manhattan complex 105,000 sq. ft. Secaucus, NJ complex

"Our Platform is Excellence"

Serving Clients Since 1980

(212) 886-3600 • (800) 274-5556

Outsourcing / Remote Computing

Your best choice for mainframe computing services.

REMOTE COMPUTING

Extensive Software Library

Telenet Tymnet
Advantis Compuserve

MVS/ESA IMS/DBDC
VM/ESA CICS SAS
VSE/ESA TSO DB2

Extraordinary Customer Service
Migration Management

708-574-3636
New England 617-595-8000
815 Commerce Drive, Oak Brook, IL 60521

FANEUIL SYSTEMS

Data Center Design & Construction

WHEN A DATA COMMUNICATION CENTER IS YOUR FUTURE. . .

- Uninterruptible Power
- Fire Suppression
- Diesel Generators
- Access Control
- Data/Tele Communication Equipment Planning



- Redundant Cooling System
- Environmental Monitoring
- Consolidation, Relocation, Expanding Evaluation Services
- Design,Engineering and General Construction Solutions

BE SURE TO SELECT THE RIGHT TECHNOLOGY SPECIALIST





FOR FURTHER INFORMATION
BRUNS-PAK, INC.
300 B CORPORATE COURT
SOUTH PLAINFIELD, NJ 07080
(908) 756-1222
FAX (908) 756-1522

THE DATA CENTER SOLUTION

Buy / Sell / Lease



When Stellar Performance Counts

Since 1980, Star has offered immediate availability on new and refurbished IBM equipment at prices that aren't out of this world. Call us and we will show you why we are ...

"The Brightest Star in the Midrange Industry"

- ★ AS/400 Systems
- ★ AS/400 Features
- ★ RS/6000 Systems
- ★ RS/6000 Features
- ★ System/36 Systems
- ★ System/36 Features
- ★ IBM DASD
- ★ IBM Tape
- ★ IBM Lexmark Printers
- ★ IBM Pennant Printers
- ★ New IBM Terminals
- ★ New IBM Controllers
- ★ New IBM Modems
- ★ New UDS & Codex Modems

1-800-548-5421 EXT 730

STAR DATA SYSTEMS

888 Isom Road ★ San Antonio, TX 78216

TEL: (210) 341-8114 FAX: (210) 341-9754

Authorized Distributor Program

Outsourcing

If Outsourcing is your objective...

You can maximize your information technology investment by outsourcing part – or all – of your IS operation. Whether it's a transitional or long-term total services partnership, American Software's the right place to rightsize.

Even software developers enjoy the cost and time-saving benefits of outsourcing with us. Call today and we'll tell you why.

®The Outsourcing Group
A Unit of American Software USA
470 E. Paces Ferry Road
Atlanta, GA 30305
404-264-5770

Used Equipment & Deinstallation

Buy, Sell, Deinstall

- Purchase of used mainframe systems and peripherals
- Deinstallation Services

Wanted to Buy

- 308x
- 3420
- 3370
- 3422
- 3380
- 3480
- 43xx
- 53xx

914-427-2151 Fax: 914-427-7791

ERR
Electronic Resource Recovery
PO Box R • Henry Henning Dr.
Maybrook, NY 12543-0316
Contact: Bob Hewitt

Bids / Proposals

MS CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by CDPA, 301 N. Lamar St., 301 Bldg, Suite 508, Jackson, MS 39201 for the following:

RFP 2668, due Tuesday, January 24, 1995 @ 3:30 P.M. for the acquisition of hardware/software to implement a 252-station LAN to access a host-based Disability Determination Services' application for the Mississippi Department of Rehabilitation Services. No charge. A mandatory bidder's conference will be held on January 5, 1995.

Vendors may request RFPs with no charge by calling Linda Watkins at (601) 359-2604. CDPA reserves the right to reject any/all bits and to waive informalities.

MARKETPLACE

APPLICATION DEVELOPER'S TOOLBOX

Looking for...

...Application development tools from an experienced developer?

The AD Toolbox has just what you're looking for ...flexible, portable, and maintainable tools for your environment/platform. Simply locate the developers providing your solutions - and give them a call.

And, if you're a developer with solutions to sell,
call **800/343-6474, ext 744**
Then watch the AD Toolbox go to work - for you!

PRINT STREAM MGMT

Enhance the Productivity of Your Legacy Applications

Introducing StreamWeaver™... the latest in print stream management technology.

With StreamWeaver, you can change your output without changing your applications. The benefits are clear:

- Combine output from multiple business applications without costly programming changes
- Increase the productivity of your legacy applications
- Extend the life of your mainframe
- Works with all IBM and IBM-compatible mainframe applications

Reduce costs. Increase efficiency. Call
(800) 624-5377

LPC
A Pitney Bowes Company

StreamWeaver is a product of PDR Automated Systems and Publications, Inc.

PARALLEL PROCESSING

AWAKEN THE GIANT



BLACKBIRD

- Save **Millions** On Main Frame Time
- Increase The Worth Of Your **Networked PCs**
- Utilize What You Know To Minimize Training
- Speed Up Compute Intensive Applications
- Off Load Data Intensive Applications
- Utilize **Millions** Of Unused CPU Cycles
- Runs On PCs With **Microsoft Windows, NT**
- Link In **UNIX** Workstations
- Provides A Blackboard Architecture
- Supports Parallel Processing Primitives
- APIs In C

NORRAD, Inc.
33 Indian Rock Road
Windham, NH 03087
1-800-5 NORRAD
1-603-434-3979 FAX
Solutions For Industry

OBJECT TOOLS

Introducing ObjectPro.

Better than C++. Better than Smalltalk.



- ObjectPro is the first visual development environment that lets you build object-oriented applications with the power of C++ and Smalltalk without forcing you to program in the low level language.
- Assembles applications from custom class libraries, industry-standard controls, or third-party components.
- Automatically generates source code, and optimizes, compiles and links programs.
- Leverages class, instance, attribute and method object constructs.

Call 1-800-234-7724 for FREE 30-day evaluation.

Trinzic

WINDOWS IMAGING

IMAGE BASIC



Imaging Magazine
Product of the Year

- Customize ALL aspects of your imaging system using Visual Basic, SQL Windows, Visual C++, or dBase for Windows
- Industry standard components are in use by over 120,000 users
- 30-day money-back guarantee eliminates risk of trying product

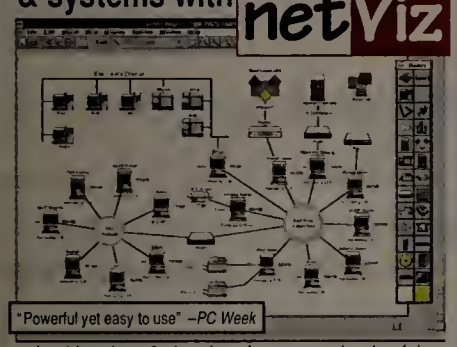
DIAMOND HEAD SOFTWARE, INC.
Call: 1-800-IBTOOLS Fax: (808) 545-7042

Novell YES Partners

yes It runs with NetWare

Network Diagram Tool

Diagram, document networks & systems with **netViz**



- Intuitive drag-&-drop interface saves loads of time
- Embed descriptive data within graphic objects
- Multi-level capability handles complex structures

Free demo version of netViz!
- CompuServe GO NETVIZ, download file NVDEMO.EXE from Library 20.
- Internet. Anonymous ftp to ftp.uu.net (IP: 192.48.96.9) and download file /vendor/netviz/nvdemo.exe.
- After download: Type "nvdemo" at DOS prompt, then follow instructions.

$395. 30-day money back guarantee.
1-800-827-1856 Quyen Systems, Inc.

Looking To Buy NetWare Products and Services?
If the Answer is "Yes," Look No Further.
Novell YES Partner's Directory in Computerworld Marketplace

Virus / Security Protection

ALL STOP VIRUSES

Violating This Law Could Cost You More Than 2 Points and $49.00

It Could Cost You Your Job!

EMD Armor™

PC and **Network Protection**. Stops **Boot Viruses**. Hard Disk Protected from **Virus Formatting**. Continuous **Virus Activity Monitor.** Correct **Power Up** insured by CMOS Protection. **Virus Protection** During File Copying/Executing. **Password Protection** Prevents Changing, Or Using Private Files. Conventional **Memory Not Used!**

Ask About Our Corporate "Try Before You Buy Policy"

EMD Enterprises **(410)583-1575,ext3020**
Fax Back...extension 4, document #1015

yes It runs with NetWare



We've Got Solutions for You...Every Week.
COMPUTERWORLD Marketplace

COBOL TOOLS

SE/One

ORDER SE/One NOW.
Only $495

The COBOL Program ***understanding*** tool. Find date routine problems. Metrics, structure analysis, interactive analysis, coding quality assessment, standards compliance. For maintenance and quality assurance.

800-457-3113
Fax: 404-667-9417
Software Eclectics, Inc
Suite 131, 10955 Jones Bridge Rd.
Alpharetta, GA 30202-7343

PROGRAMMING HURDLES

Getting You Down?

You've Turned to the Right Place!

Because...every week, you'll find the right tools for the right jobs — right here. In the new

Application Developer's Toolbox
in Computerworld Marketplace.

- Tools to build applications that are portable across a multitude of platforms.
- Tools that speed application development and make programming much less painful.
- And tools for mission-critical applications that improve your organization's competitiveness.

So turn here again next issue — and every issue — for expert help in overcoming your programming hurdles!

Solutions Directory

401(k) ADMINISTRATION

DELTA DATA SERVICES, INC.....
(800) 451-9188
Defined contribution administration software for the plan sponsor. Interfaces with payroll to administer 401K, ESOP, thrift, and profit sharing plans. Daily or periodic processing, distributions, loans, ADP/ACP testing User defined statements, voice response. Runs on AS/400 and PC.

ACCOUNTING

M • A • S 90 EVOLUTION/2 Accounting Software at Discount Prices?
Pay ***DISCOUNTED*** prices for the premier accounting solution. Industrial strength G/L, A/P, A/R, Payroll (with multiple city/state taxation), J/C, P/O, Sales Order, Point of Sale, Inv Mgmt, Time & Billing, many others. Dos/Windows/UNIX platforms supported.
CORLOR Development, Inc. (505) 281-7151

APPLICATIONS CONVERSION

AUTOMATED CONVERSION SPECIALISTS

DOS to MVS	HONEYWELL to IBM
MACRO to COMMAND	CSP to COBOL/CICS
RPG to COBOL	COBOL to COBOL II
PL/1 to COBOL	CENTURY EXPANSION

Other Platform/Language Conversions
BELCASTRO COMPUTER SERVICES, INC.
800-521-2861 216-652-1628

MIGRATION - CONSOLIDATION
SERVICES:
VSE to MVS Migrations/MVS Re-Design
Data Center Consolidations
DFSMS Migrations
Project Management
COBOL/VS to COBOL/II/370 Conversions
Systems Integration & Re-Design, Inc.
(504) 834-2293

APPLICATIONS DEVELOPMENT

APPLICATION DEVELOPER'S TOOLBOX
See proceeding page in Marketplace.

Tired of maintaining your legacy applications?
LPC..... (800) 624-5377

C++

C++ and Object Technology Training
5-day, on-site seminars on C++, Visual C++, Borland C++, OOA/OOD, Visual Basic, and C. We customize our courses to your needs. Contact us today for course outlines and pricing.
DEITEL & ASSOCIATES
deitel@world.std.com
Phone: (508) 877-0273 FAX: (508) 788-0937

C++ Training, Design, Emergency Code Repairs.
Rowe Technology .....(408) 375-9449

CLIENT SERVER DEVELOPERS

Re-Engineer NOW!!!
Let our highly motivated professionals help your corporation make the successful transition from your existing mission critical applications into object-oriented client/server systems. Powerbuilder, C/C++, Visual Basic. Sybase/Oracle/Informix. Imaging, Wireless. ISP.
Innovative Information Technologies, Inc.
1-800-352-2797

Millennium Computer Corp. "Quality Solutions"
On Schedule, Within Budget . . . . .(716) 248-0510

COMPUTER/TEL INTEGRATION

Computer/Telephone Integration
Consulting & Design.
Expert guidance for the medium to large call center environment. ANI/DNIS routing - Call/Data-screen synchronization - Caller Profile call routing. Functional Specifications-Design-Documentation.
Get it right the 1st time!
INSIGHT SERVICES 1-800-877-9024

CONTRACT PROGRAMMING

Client/Server Solutions using PowerBuilder, VAX/UNIX Acucobol. Accurate Data Systems. . . (305) 864-3835

PC programming, DOS/WINDOWS $30/hr. Courseware Appl. . . . . (612) 854-8909 Fax (612) 854-1868

NASTEL Technologies
Prime source for cost effective, high quality, onsite/offsite software development. Expertise in Oracle, Informix, Sybase, Powerbuilder, Client Server applications, re-engineering (multimedia, windows) and CAD conversions. Reliable delivery. Excellent References.
(212) 251-0787 Fax 212-689-4950

SAVE 50%-70%
ON PROGRAMMING
While using some of the most sophisticated programmers in the world. All customer contact handled in the U.S.
- **Client Server**
- **New Application Development**
- **Updating & Porting to New Platforms**

Typhoon Software, Inc.
800-499-0888

DATA RECOVERY

RANDOMEX Data Recovery Service
Hard Drives - Tapes - Floppies - Disk Packs
Crashes/Power Failures/Viruses/Fire
Average Turnaround 72 Hours
98% Success Rate On Recoverable Data
14 Years Experience * 23 Operating Systems
800-726-3669 (Long Beach, CA)
800-466-0893 (Boston, MA)

DATA WAREHOUSING

The Data Warehouse Experts
Looking for a company with years of experience in true Data Warehouse implementation? Look no further! Let Solveris help unlock the power of your information system!
Solveris Inc.
(800)-999-4829

EDUCATION & TRAINING

Information Security Training & Publications
CSI Membership includes: monthly newsletter, buyers guide, journal, training discounts, hotline, networking, more. Seminars, conferences. June Network Security Conference in New Orleans. For free sample newsletter and information:

Fax (415) 905-2218. CSI, 600 Harrison St. SF, CA 94107, phone (415) 905-2626, e-mail: prapalus@mfi.com.

Visual Basic, C++, OOA-OOD,ORACLE
Texas Software. . . . . (800) 252-7007

EASY TECHNICAL UPDATING
50-Minute videos, $29.95 each, on today's crucial topics (client/server, OOPS, software engineering, networking, AI) by over 40 leaders (Stroustrup, Bell, Knuth, Microsoft, etc.) CONTACT UVC, toll-free 1-800-900-1510 x1112; uvc.lemon@forsythe.stanford.edu. FREE CATALOG. SATISFACTION GUARANTEED.

FAX-COMPUTER INTEGRATION

ABConsultants 1-800-982-3715
Planning a fax-on-demand, fax broadcasting or fax server system? Get professional help in:
- Analyzing needs & planning the system
- Selecting the best system for superior customer service & maximum savings.
- Implementation, training and startup

Get Information by fax at 408-243-2275

GROUPWARE LOTUS NOTES

Nationwide Professional Services
Summit Software Services, Inc. . . . . (503) 226-6250

I/T CONSULTING

MAINFRAME SOFTWARE SUPPORT SERVICES OPERATING SYSTEM MIGRATION, PERFORMANCE TUNING, DATABASE, PROGRAM PRODUCT SUPPORT DATA MANAGEMENT, CICS, DB2, IMS, NCP, VTAM AND MANAGEMENT CONSULTING

CAMERON OF ATLANTA, INC. (800) 331-7635

OFFSHORE SOFTWARE DEV.

COSTA RICA - "A BETTER WAY"
Low-cost, hi-quality offshore programming, Central Time Zone, 3 hour flight from USA. Satellite Links. Oracle, Visual Basic, Powerbuilder, Sybase, C++, COBOL, AS400.
Hestair, Houston . . . . . (800) 448-7277

Hexaware Technologies -
A Blue Chip Resume:
* *Client/Server* technology focus
  - **Oracle, Sybase**
  - **Powerbuilder, Uniface, Visual Basic**
* Complete Turnkey responsibility
* Virtual 64 kbps data link from your office to India
* State-of-the-art software development center in India.....
* Large pool of quality software talent
* International quality standards
* Success stories in US/Middle East/India
* Joint Venture option

Tel: (609) 951-9195; Fax (609) 951-9638;
Partner for Success
Hexaware Technologies, Inc.
Princeton • Bombay • Bahrain • Dammam

Serving the Northwest USA
* Providers of quality software development. Options for Joint Venture. Services:

New Development	Re-engineering
Migration	Client-Server/PC/RDBMS
Testing/QA	Product Enhancement

LINCROSS SOFTWARE SYSTEMS, INC.
(206) 236-5847
INDIA • SINGAPORE

OUTSOURCING

Outsourcing/Remote Computing
IBM, MVS/ESA
Transistional Outsourcing
Specializing in high online transaction environments, Multiple mainframes, Reasonable prices
Consultec, Inc.
Contact: Carey Gibson
(800) 358-2381 ext. 330

ISO 9001 CERTIFIED OFF-SHORE/
ON-SITE SOFTWARE SERVICES
Substantial cost savings on Development, Maintenance, Conversion, Rightsizing using Indian facility with in-house IBM 9000, AS/400, RS 6000, SUN and CICS, DB2, IMS, COBOL, RPG, SYNON, Oracle, Sybase, Visual Basic, Powerbuilder, Uniface, C++.
D Square Software, Inc.
Tel: (908) 632-2688 Fax: (908) 632-2692

FANEUIL SYSTEMS provides mainframe based Outsourcing and Remote Computing Services for well over a decade. Our reputation for providing high quality services in a flexible and cost effective manner is undisputed in the industry. **Join** the many others who have already made the **right choice, call FANEUIL SYSTEMS at (708) 574-3636. (See Our Ad in the Marketplace Section)**

OUTSOURCING/REMOTE COMPUTING
For 26 years we have nationally located outsourcing services on all platforms from over 2,000 data centers. **NEVER** a fee to our buyers because we are paid by our sellers. Call us today and join over 1,500 satisfied customers!
COMPUTER RESERVES, INC.
(800) 882-0988

MCRB Service Bureau, Inc.
3090 Computer Services . . . . . .(800) 941-MCRB

PURCHASING SOFTWARE

Commerce Software, Inc. (PurchaseSQL™)
Elmsford, NY . . . . . (800) 447-7172

REMOTE COMPUTING

FANEUIL SYSTEMS provides mainframe based Outsourcing and Remote Computing Services for well over a decade. Our reputation for providing high quality services in a flexible and cost effective manner is undisputed in the industry. **Join** the many others who have already made the **right choice, call FANEUIL SYSTEMS at (708) 574-3636. (See Our Ad in the Marketplace Section)**

RIGHTSIZING

MCRB Service Bureau, Inc.
3090 Computer Services . . . . . (800) 941-MCRB

SOFTWARE REENGINEERING

Reuse Your Existing Software Assets
* Computer language translation and migration reengineering services converting into C, C++, Ada, and COBOL
* Services guaranteed for: functionality; maintainability; price; delivery date.
* Language and platform independent

Alydaar Software Corporation:
(504) 845-3322

SOFTWARE REUSE

RPM ™
Reuse Process Manager ™
"a windows and C/S based process manager with a customizable environment for defining, measuring and practicing reuse-driven software development"
developed by Dr. Carma McClure
Extended Intelligence, Inc.
(312) 346-5245 x360

SOLUTIONS DIRECTORY

Have Solutions To Sell ? For Less Than $35 per Issue, You Can Sell Them HERE!

In the Computerworld Marketplace Solutions Directory.
You simply choose the type of listing you want, and we'll run it for 26 consecutive weeks - under the category of your choice!
Plus, you can run your listing under an additional category at 50% discount rate.

Listing Type	6-Month Cost	Description
Basic	$899	2-line listing in plain typeface
Bold	$998	2-line listing in boldface type
Boxed	$1499	30-word company listing enclosed in box

Please Fax Your Listing/Category to: Nancy Whittaker 1-508-620-7739 **Or Call: 1-800-343-6474 x744**

Computerworld, Inc.

CEO/President Gary J. Beach
Executive Vice President: Steven F. Woit
Senior Vice President/Finance: Matthew C. Smith
Vice President/Human Resources: Susan C. Perry
Executive Assistant to the CEO/President Karen E. Elliott

Computerworld

An IDG Company: The World's Leader in Information Services on Information Technology

Publisher
Kevin McPherson

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-875-4394

Vice-President Editorial Bill Laberis
Vice-President Sales/Associate Publisher David Peterson
Vice-President Consumer Marketing Gail Odeneal

PUBLISHER'S OFFICE: *Assistant to the Publisher,* Lois Beninati **SALES CLASSIFIED:** *Classified Operations Director,* Cynthia Delany **MARKETING:** *Director, Marketing Communications,* Mary Doyle, *Account Manager, Marketing Communications,* Elizabeth Phillips, *Manager, Trade Show & Conventions,* Audrey Shohan, *Marketing Communications Project Manager,* Susan Thaxter, *Administrative Assistant,* Patty White **CIRCULATION:** *Director of Circulation Management,* Maureen Burke **PRODUCTION:** *Production Director,* Christopher P. Cuoco, *Production Manager,* Beverly Wolff **DISTRIBUTION:** *Distribution Manager,* Bob Wescott, *Traffic Manager,* Pat Walker

Sales Offices

Associate Publisher/Vice-President/Sales
David Peterson
Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171 Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-879-0446

Northeast
Regional Vice President: Sherry Driscoll, Senior District Managers: Bill Cadigan, John Watts, Sales Assistants: Alice Longley, Tammy Gryniewicz, Laura Holliday, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 872-2915 TDD: (800) 428-8244

Mid-Atlantic
Senior District Managers: Fred LoSapio, Vicki Gonin, Rich Molden, Sales Assistants: Susan Kusnic, Jean Dellarobba, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786 TDD: (800) 208-0288

South-Atlantic
Regional Vice President: Bernie Hockswender, Sales Assistant: Jennifer Pattenaude, 3675 Crestwood Parkway, Suite 400, Duluth, GA 30136 (404) 931-8104 FAX: (404) 931-8106 TDD: (800) 449-4974

Midwest
Senior District Manager: Sharon R. O'Brien, Sales Assistant: Denice Richards, 980 N. Michigan Avenue, Suite 1400, Chicago, IL 60611 (312) 214-3606 FAX: (312) 214-4962

Southwest
Senior District Manager: Darren Ford, Sales Assistant: Brenda Shipman, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882 FAX: (214) 385-1603 TDD: (800) 822-4918

Northern California
Vice-President Western Advertising Sales: Richard Espinoza, Senior District Managers: Ernie Chamberlain, Kaye Sharbrough, Linda Holbrook, District Managers: Christine Curry, Elizabeth Cooper, Lisa Kowalski, West Coast Operations Manager: Leticia Lehane, Executive Assistant: Denise Hui, Sales Assistants: Emily Gaytan, Shannon Dempsey, Denise Garcia, Andrea Zurek, Jim Schott, Colleen Molnar 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312 TDD: (800) 900-3179

Southern California
19800 MacArthur Blvd., Suite 500, Irvine, CA 92715 (714) 757-4123 FAX: (714) 757-4124

Advertising Operations
Display Advertising Production Manager: Paula Wright, Display Advertising Coordinators: Lisa Tanner, Peggy Hennessy, Gregg Pinsky, (508)-879-0700 FAX: (508) 879-0446

Custom Publications
Boston: Vice President/Larry Craven, Director of Publishing Services/Carolyn Novack, Sales Assistant/Heidi Broadley, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 879-0446
San Francisco: West Coast Director/Elaine R. Offenbach, Sales Assistant/Nikki Wilson, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

Client/Server Journal
East: Sherry Driscoll, 375 Cochituate Rd., Box 9171, Framingham, MA 01701-9171, (508) 879-0700 FAX (508) 872-2915
West: Kaye Sharbrough, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

Marketplace Advertising
New England Account Executive/Susan Cardoza, **Mid-Atlantic** Account Executive/Michelle Reeves, **South-Atlantic/Midwest** Account Executive/Kevin Gasper, **Northwest** Account Executive/Andrew Sambrook, **Southwest** Account Executive/Claude Garbarino, Marketing Communications Manager/Karen Lesko, Solutions Directory/Nancy Whittaker, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474 FAX: (508) 820-0941

Recruitment Advertising Sales Offices
Vice President/Recruitment Advertising/John Corrigan, Marketing Director/Derek E. Hulitzky, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474
New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, Account Executive/Nancy Mack, (800) 343-6474
Mid-Atlantic: Regional Manager/Marty Finn, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090, Account Executive/Caryn Dlott, (800) 343-6474 TDD: (800) 208-0288
South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith (800) 343-6474
Midwest: Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (708) 827-4433, Sr. Account Executive/Ellen Cross (800) 343-6474 TDD: (800) 227-9437
West: Regional Manager/Barbara Murphy, 2171 Campus Drive, Ste. 100, Irvine, CA 92715 (714) 250-0164, Sr. Account Executive/Christopher Glenn (800) 343-6474 TDD: (800) 203-5867
Computer Careers Online: Jay Savell, Account Executive, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474

Direct Response Cards
375 Cochicuate Rd., Framingham, MA 01701-9171 (800) 343-6474
East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090
West: Account Manager/Jill Greer, 2171 Campus Drive, Ste. 100, Irvine, CA 92715 (714) 250-0164

Compinterworld Database Division
Vice President/General Manager, Customer Information Division: Richard Mikita, Vice President Sales: John Carpenter, Sales Assistant: Jennifer Claus.
East: Account Executive VAR Database, Carol Mullen, Database Representative, Buyers Database, Linda Clinton, (508) 879-0700 FAX: (508) 879-0184
West: Account Executive VAR Database, Chris Jones, Database Representative, Buyers Database, Gena Haas, (415) 347-0555 FAX: (415) 347-8312

Response Technologies
President: Charles Coleman, Chief Operating Officer: Jaye Tyler, (508) 626-1700 FAX: (508) 626-0027, Internet: rti @ delphi.com, CompuServe: 74403,2745

International Data Group

Chairman of the Board, Patrick J. McGovern; **President,** Kelly Conlin; **Chief Operating Officer,** Jim Casella; **Vice President Finance,** William P. Murphy

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 200computer publications in 63 countries. Forty million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S Computerworld Argentina, Infoworld Argentina; AUSTRALIA'S Computerworld Australia, Australian PC World, Australian Macworld, Network World, Mobile Business Australia, Publish!, Reseller, IDG Sources; AUSTRIA'S Computerwelt Oesterreich, PC Test; BELGIUM'S Data News (CW); BOLIVIA'S Computerworld; BRAZIL'S Computerworld, Gamepro, Game Power, Mundo Unix, PC World, Publish, Super Game; BULGARIA'S Computerworld Bulgaria, Edworld, PC & Mac World Bulgaria, Network World Bulgaria; CANADA'S CIO Canada, Computerworld Canada, Graduate Computerworld, InfoCanada, Network World Canada, Reseller; CHILE'S Computerworld Chile, Informatica; COLOMBIA'S Computerworld Columbia PC World; COSTA RICA'S PC World; CZECH REPUBLIC'S Computerworld, Elektronika, Macworld, PC World, DENMARK'S Communications World, Computerworld Danmark, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Tech World, Windows World; ECUADOR'S PC World; EGYPT'S Computerworld(CW) Middle East, PC World Midde East, FINLAND'S Mikro PC, Tietoviikko, Tietoverkko; FRANCE'S Distributique, GOLDEN MAC, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux, GERMANY'S Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Electronic Entertainment, Gamepro, Information Management, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Umt, GREECE'S Infoworld, PC Games; HONG KONG'S Computerworld Hong Kong, PC World Hong Kong; HUNGARY'S Computerworld SZT, PC World; INDIA'S Computers & Communications; INDONESIA'S Info Komputer; IRELAND'S ComputerScope; ISRAEL'S Computerworld Israel, PC World Israel; ITALY'S Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Itaha, PC Shopping Italy, PC World Italia; JAPAN'S Computerworld Today, Information Systems World, Macworld Japan, Nikkei Personal Computing, SunWorld Japan, Windows World; KENYA'S East African Computer News; KOREA'S Computerworld Korea, Macworld Korea, PC World Korea; LATIN AMERICA'S GamePro;p MALAYSIA'S Computerworld Malaysia, PC World Malaysia; MEXICO'S Conipu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; THE NETHERLANDS' Computer! Totaal, Computable (CW), LAN Magazine, MacWorld, Totaal "Windows"; NEW ZEALAND'S Computer Listings, Computerworld New Zealand, Network World, New Zealand PC World; NIGERIA'S PC World Africa; NORWAY'S Computerworld Norge, CWorld, Lotusworld Norge, Macworld Norge, Networld, PC World Ekspress, PC World Norge, PC World's Produkt Guide, Publish & Multimedia World, Student Data, Unix World, Windowsworld; IDG Direct Response; PAKISTAN'S PCWorld Pakistan, PANAMA'S PC World Panama; PERU'S Computerworld Peru, PC World, PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, China Infoworld, China PC & Communications Magazine, Computer Fan, PC World China, Electronics International, Electronics Today/Multimedia World, Electronic Product World, China Network World, Software World Magazine, Telecom Product World; PHILIPPINES' Computerworld Philippines, PC Digest (PCW); POLAND'S Computerworld Poland, PC World/Komputer; PORTUGAL'S Cerebro/PCWorld, Correio Informatico/Computerworld, Macin, ROMANIA'S Computerworld, PC World, Telecom Romania, RUSSIA'S Computerworld-Moscow, Mir PK (PCW), Sety (Networks); SINGAPORE'S Computerworld Southeast Asia, PC World Singapore; SLOVENIA'S Monitor Magazine; SOUTH AFRICA'S Computer Mail (CIO), Computing S.A., Network World S.A., Software World; SPAIN'S Advanced Systems, Amiga World, Computerworld Espana, Communicaciones World, Macworld Espana, NeXTWORLD, Super Juegos Magazine (GamePro), PC World Espana, Publish; SWEDEN'S Attack, ComputerSweden, Corporate Computing, Macworld, Mikrodatorn, Natverk & Kommunikation, PC World, Publishing & Design (CAP), Dataingenjoren, Maxi Data, Windows World; SWITZERLAND'S Computerworld Schweiz, Macworld Schweiz, PC Tip; TAIWAN'S Computerworld Taiwan, PC World Taiwan; THAILAND'S Thai Computerworld; TURKEY'S Computerworld Monitor, Macworld Turkiye, PC World Turkiye; UKRAINE'S Computerworld, UNITED KINGDOM'S Computing/Computerworld, Connexion/Network World, Lotus Magazine, Macworld, Open Computing/Sunworld, UNITED STATES' Advanced Systems, AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Digital Video, DOS Resource Guide, Electronic Entertainment Magazine (E2), Federal Computer Week, GamePro, IDG Books, Infoworld, Laser Event, Macworld, Multimedia World, Network World, PC Letter, PCWorld, PlayRight, Power PC World, Publish, SWATPro, Video Event; VENEZUELA'S Computerworld Venezuela, PC World Venezuela, VIETNAM'S PC World Vietnam

Have a Problem With Your Computerworld Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:
COMPUTERWORLD, P.O. Box 2043, Marion, Ohio 43305-2043.
Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Address Changes or Other Changes to Your Subscription
All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line.

Your New Address Goes Here Address shown: ❑ Home ❑ Business

Name
Company
Address
City State Zip

Name
Title Company
Address
City State Zip

Other Questions and Problems
It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available: **1-800-669-1002** Outside U.S. call (614) 382-3322.
CompuServe members can reach us at account number 73373, 1230

Advertisers' Index

Avalon	9
Borland	13
Cabletron	3
Computer Associates	18-19, 36-37, 54-55
CW Custom Publications	14
Dell	74-75, C4
Digital Equipment Corp.	22-23, 62-63, 86-87
EDS	84-85
IBM	26-27, 78-79, 92, C3
Information Builders	88
Innovation Data Processing	7
Legent Software	32-33
Micom	76
Micro Focus	11
Mobile Insights '95	93
NetManage	29
Platinum Software	5
SAS Institute	50-51
SunSoft	43-45
Windows World Open	80

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Marketplace Advertisers' Index
Pages 111-118

Alicomp, Inc.	(800) 274-5556
American Software	(800) 264-5770
Apex PC Solutions	(206) 861-5858
Boxlight	(800) 762-5757
Brixton Systems	(800) BRIXTON
Bruns-Pak	(908) 756-1222
Computer Marketplace	(800) 858-1144
Cylink Corp.	(800) 533-3958
Dempsey Business Systems	(800) 888-2000
Electronic Resource Recovery	(914) 427-2151
Faneuil Systems	(708) 574-3636
Knozall	(800) 333-8698
Lodestar Technologies	(800) 776-4346
NC3	(315) 438-4400
NetManage Inc	(315) 373-7174
Panelight	(800) 226-3249
Raritan Computer Inc.	(908) 874-4672 X39
Secure It	(800) 451-7592
Server Technology Inc	(800) 835-1515
Spectra Equipment	(800) 745-1243
Star Data	(800) 548-5421
Telenex	(800) 232-6117
Trinzic Corp	(415) 328-4567

Companies in this issue

Page number refers to page on which story begins

3Com Corp. 57,58,82
800-Flowers 25

A

A. O. Smith, Inc. 6
Aberdeen Group 4,77,85
Acer America Corp. 76
Adobe Systems, Inc. 59
Agile Networks, Inc. 58
Air Products and Chemicals, Inc. 20
AJM Professional Services 31
Alantec Corp. 59
Alliance Development, Inc. 12
Amber Wave Systems, Inc. 58
America Online, Inc. 25,28
American Airlines 49
American Cyanamid Co. 38
American Express Co. 28
American Management Systems, Inc. 38,46
Ameritech Corp. 48
Apple Computer, Inc. 6,47,49,57,72,76,78
Arbor Software Corp. 84
Ardis Co. 82
ARS, Inc. 12
Associated Grocers, Inc. 72
ASK Group, Inc. 83
AST Research, Inc. 76
AT&T Corp. 49,57,76
Auspex, Inc. 59
Autodesk, Inc. 59
Avalon Software, Inc. 48,49
Avid Technology, Inc. 59
Avis, Inc. 35

B

Banc One Corp. 40
BankAmerica Corp. 28
Bankers Trust Co. 58
Banyan Systems, Inc. 77
Barclay's Bank 72
Bay Networks, Inc. 1,10,57,58,82
BayBank Systems, Inc. 49
Bayer AG 67
Bell Atlantic Corp. 25,28,60
Best-Buy Co. 8
BIS Strategic Decisions 60,72
Blue Cross/Blue Shield of California 47
BMC Software, Inc. 59
Borland International, Inc. 1,56
Broderbund Software, Inc. 59
Brooks Brothers 25
BSG Corp. 38,59
Burger King Corp. 1
Burlington Coat Factory Warehouse Corp. 53
Business Objects, Inc. 48,49

C

Cabletron Systems, Inc. 1,10,57,58,82
Caere Corp. 73
California Technology 59
Cambridge Technology Partners, Inc. 38,59
Canon Computer Systems, Inc. 73
Carolina Power & Light Co. 46
Centillion Networks, Inc. 58
Chevron Corp. 10
Chevron USA 49
Chrysler Corp. 82
Chrysler Financial 92
Cigna Corp. 48
Cisco Systems, Inc. 1,57,82
Coda, Inc. 85
Cognos Corp. 49
Collabra Software, Inc. 4
Community Mutual Insurance Co. 40
Compaq Computer Corp. 4,76
Component Integration Laboratories 72
Computer Associates International, Inc. 35,49,56,59,83,85,89
Computer Intelligence InfoCorp. 6,77
CompuWare Corp. 59
Conneighton Group 4
Conoco, Inc. 47
Consolidated Edison Co. 73
Convex Computer Corp. 79
Coram Healthcare Corp. 83
Cray Research, Inc. 79
Creative Strategies, Inc. 4
CSC Consulting Group 42
CSX Technology, Inc. 1
Cummins Engine Co. 48
Currid & Co. 10,31

D

D. H. Andrews Group, Inc. 83
Daratech, Inc. 93
Datalogix International, Inc. 49
Dataquest, Inc. 4,6,10,12,42,72,78,84
Dean Witter Reynolds 1
Decisis, Inc. 53
Deere & Co. 47
Dell Computer Corp. 1,76
Deloitte & Touche 81
Delta Air Lines 31
DHL Airways 6
Digital Equipment Corp. 8,48,57 59,72,79,84
Dimensional Insight, Inc. 48
Distributed Technologies Corp. 10
Dow-Corning, Inc. 73
Du Pont Co. 47
Dunlop Tire Corp. 60
Dynasty Technologies, Inc. 89

E

EA Systems, Inc. 84
Edify Corp. 49
Edmark Corp. 59
Egghead, Inc. 59
Entex Information Services 12
Equifax, Inc. 28

F

FileNet Corp. 78
First Albany Corp. 59
First Data Corp. 20
First Union National Bank 40
First Virtual Holdings, Inc. 20,24
Ford Motor Co. 8,47,49
Forte Software, Inc. 89
FoxMeyer Health Corp. 42

G

Galileo International 83
Gateway 2000, Inc. 76
GE Aerospace 47
GE Plastics 20
Gemini Consulting 42
General Electric Co. 20
Great Western Bank 1
GTE Corp. 49
Guide International Corp. 42
Gupta Corp. 59,89

H

Harley-Davidson, Inc. 83
HealthSource, Inc. 48
Hewlett-Packard Co. 8,42,49,57 72,76,79,82
Household Credit Services 1
Household International 1
Hughes Aircraft Co. 49
Hurwitz Consulting Group, Inc. 38,89

I

IBM 1,8,42,48,49,53,57,72 73,76,77,78,79,83,89
IBM PC Co. 1
Illinois Central Corp. 60
Information Builders, Inc. 48
Informix Corp. 56,59
Informix Software, Inc. 49,89
Inteco Corp. 8
Intel Corp. 1,6,12,53,60,79
IntelliCorp, Inc. 49
Intuit, Inc. 59

J

JC Penney Co. 8,25
Jensen Securities Co. 59

K

Kalpana, Inc. 58,82
KeyCorp 8
Kidder, Peabody & Co. 83

L

Legato Systems, Inc. 49
Legent Corp. 56,59
LightStream Corp. 82
Link Resources Corp. 12,82
Liposome Technology, Inc. 77
Lockheed Corp. 47
Lotus Development Corp. 1,49,56,58 64,72,78,81,93

M

Macromedia, Inc. 59
MapInfo Corp. 59,93
McAfee Associates, Inc. 10
McCann-Erickson Worldwide 82
MCI Communications Corp. 1,20,30,66
Mead Data Central 24
Mercury Research, Inc. 1
Merrill Lynch & Co. 8
Micro Focus, Inc. 8
Micrografx, Inc. 73
Micron Corp. 59
Microsoft Corp. 1,4,6,8,20,46,56,59,64 72,73,77,78,79,81,83,84,85,89,93
Monash Information Systems 89

N

National Semiconductor Corp. 48,66
Netscape Communications Corp. 4,20,30
Neuron Data, Inc. 49
Nevada Power Co. 73
Newport News Shipbuilding and Drydock Co. 84
Next Computer, Inc. 92
NiceCom, Inc. 58
Nike Corp. 49
Novell, Inc. 1,4,49,57,64,77,78,81,83,89,93

O

Open Market, Inc. 20,24
OpenVision Technologies, Inc. 49,59,81
Oracle Corp. 8,10,35,49,56,59,60,85,89

P

Pacific Bell Mobile Services 12
Packard Bell Electronics, Inc. 28,76,81
Parametric Technology Corp. 59
Patricia Seybold Group 79,81
PeopleSoft, Inc. 59,85
Perot Systems Corp. 66
Planar Systems, Inc. 59
Platinum Software Corp. 85
Powersoft Corp. 56,78,89
Praxis International, Inc. 8,89
Price Waterhouse 1,82
Prism Solutions, Inc. 49
Project Software & Development, Inc. 59
Prucare, Inc. 47

R

RAM Mobile Data USA L.P. 82
Raymond James & Associates 59
Red Brick Systems, Inc. 48,49
Rheometric Scientific, Inc. 4
Richardson Electronics Ltd. 48
RSA Data Security, Inc. 66
Ryder System, Inc. 35

S

Sage Network Research, Inc. 82
SAP America, Inc. 48,56,59,85
SAP of Germany 49
SAS Institute, Inc. 48
Seagate Technology, Inc. 59
Sears, Roebuck and Co. 25
Security Dynamics, Inc. 66
Sequent Computer Systems, Inc. 59
Sherpa Corp. 49
Siemens Nixdorf Informationssysteme AG 12
Signet Bank 49
Silicon Graphics, Inc. 49,59
Silicon Reef, Inc. 1
Software AG of North America 8
Spalding Software, Inc. 73
Sprint Corp. 46
SQL Financials, Inc. 48
SRI International 81
Storage Technology Corp. 49,59
Strategic Mapping, Inc. 10,93
Stratus Computer, Inc. 59
Sun Microsystems, Inc. 35,49,57,79
SunSoft, Inc. 53,76
Swiss Bank 92
Sybase, Inc. 8,10,49,56,59,89
Symantec Corp. 8,53,56
SynOptics Communications, Inc. 1,58,82

T

Taligent, Inc. 73
Tektronix, Inc. 59,73
The Chase Manhattan Bank NA 35,60
The Radicati Group 81
The SoftAd Group 8
The Tenagra Corp. 1
The Toro Co. 35
Tivoli Systems, Inc. 49,59
Toshiba America Information Systems, Inc. 4,76
Trader Joe's Co. 6
Traveling Software, Inc. 64
Treacy & Co. 8
Tullet & Tokyo Forex, Inc. 1

U

UB Networks, Inc. 82
UBS Securities 1
Uniface Corp. 59
Unisys Corp. 42,59
United Parcel Service, Inc. 25,35
United Way 49
US West, Inc. 6
US Air 8

V

Visa International, Inc. 20
Vobis Microcomputer AG 73
Volpe, Welty & Co. 59

W

Wang Laboratories, Inc. 78
Watkins Motor Lines, Inc. 78
Weitek Corp. 59
Wellfleet Communications, Inc. 1,58,82
Wells Fargo Bank 49
WordPerfect 72
WorkGroup Technologies, Inc. 84

X

XDB Systems 8
Xerox Corp. 60,72
Xylan Corp. 58

Second-class postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385697. Computerworld (ISSN 0010-4841) is published weekly; except a single combined issue for the last week in December and the first week in January by Computerworld, Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1994 by Computerworld, Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed in back issues, if available, may be purchased through the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by Computerworld, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, Computerworld, Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $3.00 a copy U.S. — $48 a year; Canada — $110 a year; Central & So. America — $150 (surface) a year; Europe — $295 a year; all other countries — $295 a year. Subscriptions call toll free (800) 669-1002. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, P.O. Box 2044, Marion, OH 43305.

Borland's Maib resigns

CONTINUED FROM PAGE 1

erations. A Borland spokesman would not comment on that possibility.

Reaction to the executive shuffle was swift and negative.

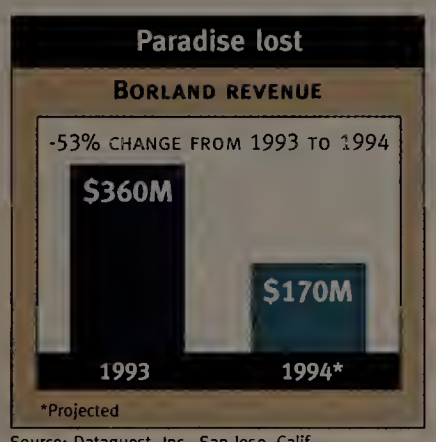
"I still don't understand how [Borland's board] would let Philippe run this company when he has already driven it straight into the ground," said Timothy McCollum, an analyst at Dean Witter Reynolds. "Their best chance was in letting Maib run the company."

Lost customers

Borland's inability to execute its operations has cost it some customers, said Bill Meeker, director of the dBase User Group in Kansas City, Mo. Borland was slated to make a presentation before the group earlier this year.

"They didn't show up, and they didn't even bother to call and tell us they wouldn't make it," Meeker said. "Borland doesn't act like a winning team. Microsoft does. They show up often at the Access User Group meetings. Their group is getting bigger while our group is getting smaller."

Borland's board of directors responded to Maib's departure by promoting Chief Financial Officer Gary Wetsel to executive vice president of operations. Wetsel, who started at Borland Nov. 1, will assume Maib's operations responsibilities until a replacement is named. Maib, meanwhile, will stay on indefinitely as a non-officer employee.



Source: Dataquest, Inc., San Jose, Calif.

Maib was not available for comment.

However, Maib told *Computerworld* one week prior to his announced departure that rumors of his resignation were "bad and dangerous." He insisted he had not resigned and was not considering it, citing his job as half-done.

Now, with Maib on his way out, Borland faces what it describes as a "substantial operating loss" for its quarter ended Dec. 31, 1994. Moreover, the company is expected to implement layoffs of up to 600 staffers and a restructuring while rolling out a major new product — Delphi 95 — in the first quarter of 1995. The beleaguered developer could also find itself selling off its database product lines as part of its restructuring efforts.

Slash in cash possible

Borland could also face a significant cash drain, resulting from a lawsuit in which it was found by a lower court to have violated the copyright of Lotus Development Corp.'s 1-2-3. An appeals court ruling is expected shortly; if it upholds the earlier verdict, damages would be assessed in March.

Estimates of Borland's damages range from a nominal charge to more than $200 million. While Borland has no contingency fund set aside for the charges, it will hold an estimated $50 million in cash at the close of its fiscal year ending in March.

Borland's woes are causing some discomfort for its business partners. For example, WordPerfect, the Novell, Inc. Applications Group has invested substantial sums and resources to enable Borland to develop Paradox for Windows for its PerfectOffice suite.

"It would set us back a lot to go back and rethink the database" for the suite, acknowledged Glen Mella, a product manager for PerfectOffice. He said negotiations with Borland ended after Borland sold its Quattro Pro spreadsheet. He would not comment on whether any further talks were proceeding with Borland over the fate of Paradox.

"There's all kinds of thinking and talking going on," Mella said.

Cyberspace

CONTINUED FROM PAGE 1

suggested that on-line communication accelerates the pace of dialogue among interested parties and the formation of public opinion. "On the 'net, information may not get out any faster, but the part that forms a conclusion happens faster," he said.

Look who's talking

For example, from a consumer standpoint, the Internet enables anyone with a gripe against a product or company to bypass the frustrating and seemingly isolated letter of complaint and immediately broadcast his outrage to an audience of thousands, if not millions. The result can be virtually instantaneous feedback about the extent of the problem or about whether other purchasers feel the same way — which has the potential to undercut any vendor attempt at spin control.

"Many times I've seen companies be vilified on the Internet, and I'm sure they don't know about it," said Clifford R. Kurtzman, president and chief executive officer at The Tenagra Corp., an Internet marketing company in Houston.

Kurtzman told the story of MCI Communications Corp., which started its Gramercy Press campaign by announcing the on-line service during the 1994 U.S. Open tennis tournament.

"People in the rec.sport.tennis newsgroup were saying how poor the ads were," said Kurtzman, adding that MCI obviously never checked the newsgroup to defend its ads and possibly drum up business for its on-line offerings.

Bradley Stillman, legislative counsel at the Consumer Federation of America in Washington, said the phenomenon of on-line consumer advocacy makes sense given that the demographic picture of the Internet includes a sizable number of "highly knowledgeable, grassroots advocates." He said these Internet communities are beginning to sound off on nontechnical matters such as public policy and legislation.

Things get out of hand quickly on the 'net. Just before Christmas, thousands of people mail-bombed three Santa addresses after hearing a rumor that a sponsor would send 10 cents to charity for each note received. The rumor stemmed from a real story: Sun Microsystems, Inc. built a World-Wide Web site (north.pole.org) and said it would donate the 10 cents, up to $25,000, to charity for every visit.

One thing is certain: Millions of new users will join the Internet in the coming years, which means low-tech and no-tech businesses will increasingly be expected to answer consumer questions and complaints in this space.

In the Intel case, the public relations debacle may have been partly a matter of Intel's failure to accurately gauge the extremely high expectations of on-line users when it comes to responsiveness, according to John Barnhill, president of Silicon Reef, Inc., a San Francisco systems integrator that specializes in Internet and internetworking organizational issues.

"There's an expectation that within 24 hours or less there will be some sort of response" to a posting about a glitch or an E-mail requesting information, he said.

Perhaps in recognition of this, Intel President Andrew Grove posted a personal note in a key Internet forum. In it he apologized for the anxiety and offered his perspective on the situation.

An Intel spokeswoman said Intel observed two spikes in E-mail traffic related to the Pentium. The first followed Grove's newsgroup posting; the second came after IBM said it would stop shipping Pentium machines. Intel has full-time employees who check relevant Internet newsgroups, she said.

A difference in perception

Hahn said Grove's posting only "threw oil on the fire" because it came across as a media relations ploy rather than sincere participation in the discussion. Conversely, developers such as Microsoft Corp. and IBM have managed to avoid getting pummeled by the on-line community because they participate in on-line communities of interest, offering technical tips and software fixes, Hahn said.

Even so, this leaves excruciatingly little wiggle room for companies struggling with a crisis. Marketing experts said firms need plans analogous to disaster-recovery plans for these situations. For starters, they should participate in on-line forums and catch problems early, one analyst said.

New chips

CONTINUED FROM PAGE 1

sive replacement effort.

With an estimated 30% to 70% of all Pentium users likely to demand replacements for their flawed processor, "the bulk of the process should take about two quarters," estimated Dean McCarron, a chip analyst at Mercury Research, Inc. in Scottsdale, Ariz.

Under its new policy, Intel will send replacement processors to PC users who choose to replace the chip themselves and will offer them telephone technical assistance. Intel also said it planned to contract with service providers and OEM customers to replace the chip at no charge. Details will be provided in the next few weeks.

Despite the clarity of Intel's intentions, the devil will undoubtedly be lurking in the details, observers said. For instance, it could take several weeks for Intel just to identify third-party service locations and ship the necessary replacements to them. The company is still ramping up production of clean chips, and full volume is not expected until at least the end of January. Intel is quoting lead times of 30 to 45 days for replacement processors.

Who's calling whom?

There is also some uncertainty over who should handle customer calls and how. For instance, one Dell Computer Corp. customer who had a contract with Intel for a replacement was suddenly asked by Intel to renew his request all over again — with Dell instead.

The confusion apparently stems from the sudden desire by most major PC suppliers to handle the replacement process themselves — a precedent first set by the IBM PC Co. Dell, like all of the other major PC vendors, has asked Intel to refer Dell customers back to the company for all chip replacements. "Since the customers purchased the computers from us directly, we are asking that they come to us for replacement," a Dell spokeswoman said.

Other vendors agree. In many cases, this stance has led Intel to deflect customer calls back to companies that had originally asked the customers to contact Intel. At the same time, in all instances where customers demand a replacement from Intel, the company will comply, Intel said.

"I would rather go back to the system provider than to Intel. We are not dealing directly with Intel anyhow, so why should we go to them now?" asked Aijaz Nawdhia, a LAN administrator at Burger King Corp. in Miami.

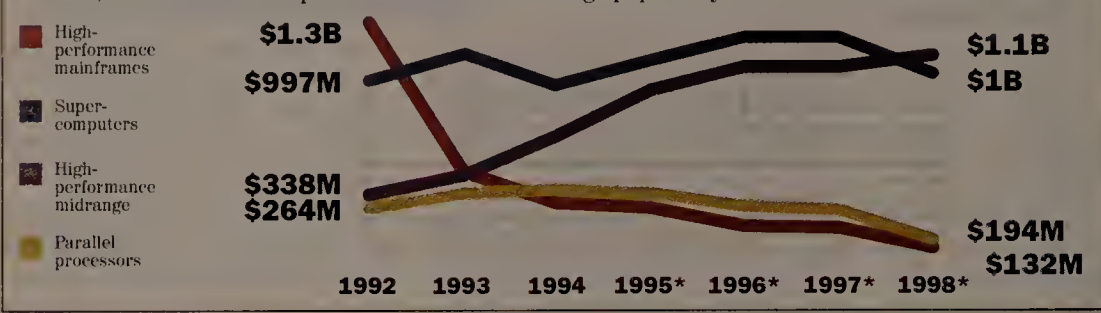
There is also some uncertainty over whether self-replacement of processors would lead to a void in system guarantees in the future. Most vendors contacted said it would not. However, self-replacement or even third-party replacement could prove difficult. For instance, the heat sinks Intel is shipping with its replacement processors are not sufficient for the airflow characteristics of Dell's designs and could actually fry the processor down the road if not properly installed, Dell said.

INDUSTRY PULSE: High-performance computing

A diversity of new products will result in erratic behavior in the high-performance computing market over the next few years, with low-end and midrange systems becoming the driving force

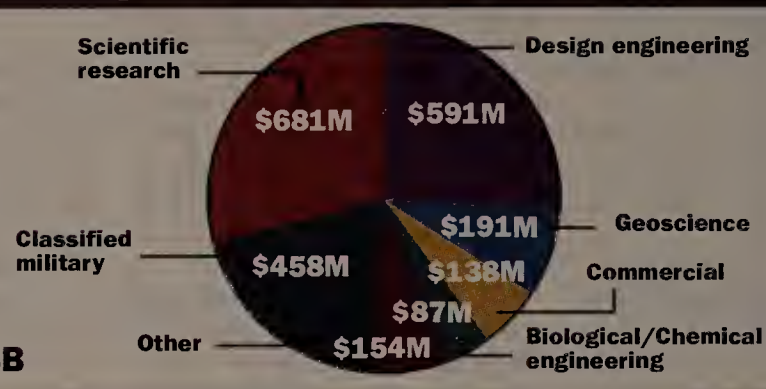
Changes in platform popularity

Changes in defense and government spending and a focus on price/performance instead of absolute performance will alter market segments. High-performance mainframes will decline into a maintenance market, while RISC-based products will boost midrange popularity.



Uses of high-performance computers

Traditionally dominated by science and research, the high-performance market has begun to see a growing presence of financial and economic modeling and strategic business applications



1993 total: $2.3B

Market leaders

While IBM still leads a declining mainframe segment, it is developing a strong presence in the midrange arena

Supercomputers	1993 revenue	Share
Cray Research	$843M	76%
Fujitsu	$155M	14%

High-performance midrange	1993 revenue	Share
Convex	$145M	35%
Silicon Graphics	$122M	29%
IBM	$65M	16%

High-performance mainframes	1993 revenue	Share
IBM	$374M	81%
Amdahl	$47M	10%

Parallel processors	1993 revenue	Share
Intel SSD	$93M	30%
Thinking Machines	$90M	29%

*Projected

Source: International Data Corp., Framingham, Mass.

How to contact *Computerworld* editors:

	Phone:	Fax:
Main office, Framingham, Mass.	(508) 879-0700	(508) 875-8931
24-hour tip line	(508) 820-8555	
Mid-Atlantic bureau, Rochelle Park, N.J.	(201) 587-0090	(201) 712-1308
Washington bureau, Washington	(202) 347-0134	(202) 347-2365
Midwest bureau, Des Plaines, Ill.	(708) 827-4433	(708) 827-3159
West Coast bureau, Burlingame, Calif.	(415) 347-0555	(415) 347-6831
Northwest bureau, Bellevue, Wash.	(206) 641-7770	(206) 747-1021

Electronic mail: *Computerworld*'s writers and editors have individual **MCI Mail** accounts. Most of our staff members can be reached on MCI Mail by addressing messages to their first and last names as they appear on the masthead, which is opposite the editorial page. For a complete list of editorial MCI Mail addresses, message Linda Gorgone at 597-8014.

Our **CompuServe** account number is 76537,2413. Please use that account only for communications with writers and editors. Computerworld cannot guarantee response to all inquiries. Direct subscription inquiries to CompuServe: 73373,1230.

Letters to the editor and other editorial-related messages can be sent via **Internet** to letters@cw.com

Client/server Journal: Contact Editor Alan Alper at (508) 820-8115 or via Internet at aalper@cw.com

Subscriptions: Inquiries and changes of address should be sent to P.O. Box 2043, Marion, Ohio 43305-2403 or call (800) 669-1002.

Reprints: Contact Sharon Bryant at (508) 820-8125.

Rapid Reference clipping service: (800) 343-6474 x554.

Inside Lines

Understatement of the year

After weeks of harsh criticism about his role in Intel's recent public relations debacle, CEO Andrew Grove may have been understating things a bit when he finally announced a no-questions-asked chip replacement policy. "The past few weeks have been deeply troubling," he said. "What we view as an extremely minor technical problem has taken on a life of its own."

New year, old org chart

Larry Ellison, Oracle's CEO, has decided to bring the firm's marketing department back under his own command and remove it from Ray Lane, an executive vice president. Some observers saw the move — which has so far cost Oracle at least three high-level executives — as just another internal line dance. But others wondered whether key new products due out in 1995, such as CDE2 or Project X development tools, could be delayed as a result.

The pope is not amused

Cable News Network broadcast a news report in late December — complete with Microsoft denials — about the possibility that Microsoft planned to acquire the Catholic Church. It seems CNN took a joke racing around the Internet a little too seriously. It all started with a clever 'net surfer who concocted a bogus press release that had Microsoft merging with the Vatican. In the tongue-in-cheek release, Bill Gates marveled at the Spanish Inquisition and other examples of Catholicism's history of "aggressive marketing."

Power to the people

Santa Cruz County in California is taking a proletarian approach to buying PCs as it puts in networks to run some of its applications. "We give them to the secretaries first because they actually use them," said Luther Perry, information services director for the county. Perry added that a lot of frustrated managers still have to make do with plain old mainframe terminals while their underlings get to create compound documents and play solitaire. Managerial types can get in line to join the PC fun "as soon as they figure out what they're going to use it for," he said.

A rift on the electronic frontier

Like a religious sect that splits up over subtle philosophical differences, the Electronic Frontier Foundation (EFF) in Washington has ousted policy chief Jerry Berman and replaced him with Washington cyberattorney David Johnson. Berman and two other EFF policy wonks are now starting an independent Center for Democracy and Technology. Meanwhile, the EFF plans a broader mission defending cyberspace on such topics such as liability, copyright, access, security, governance and globalization.

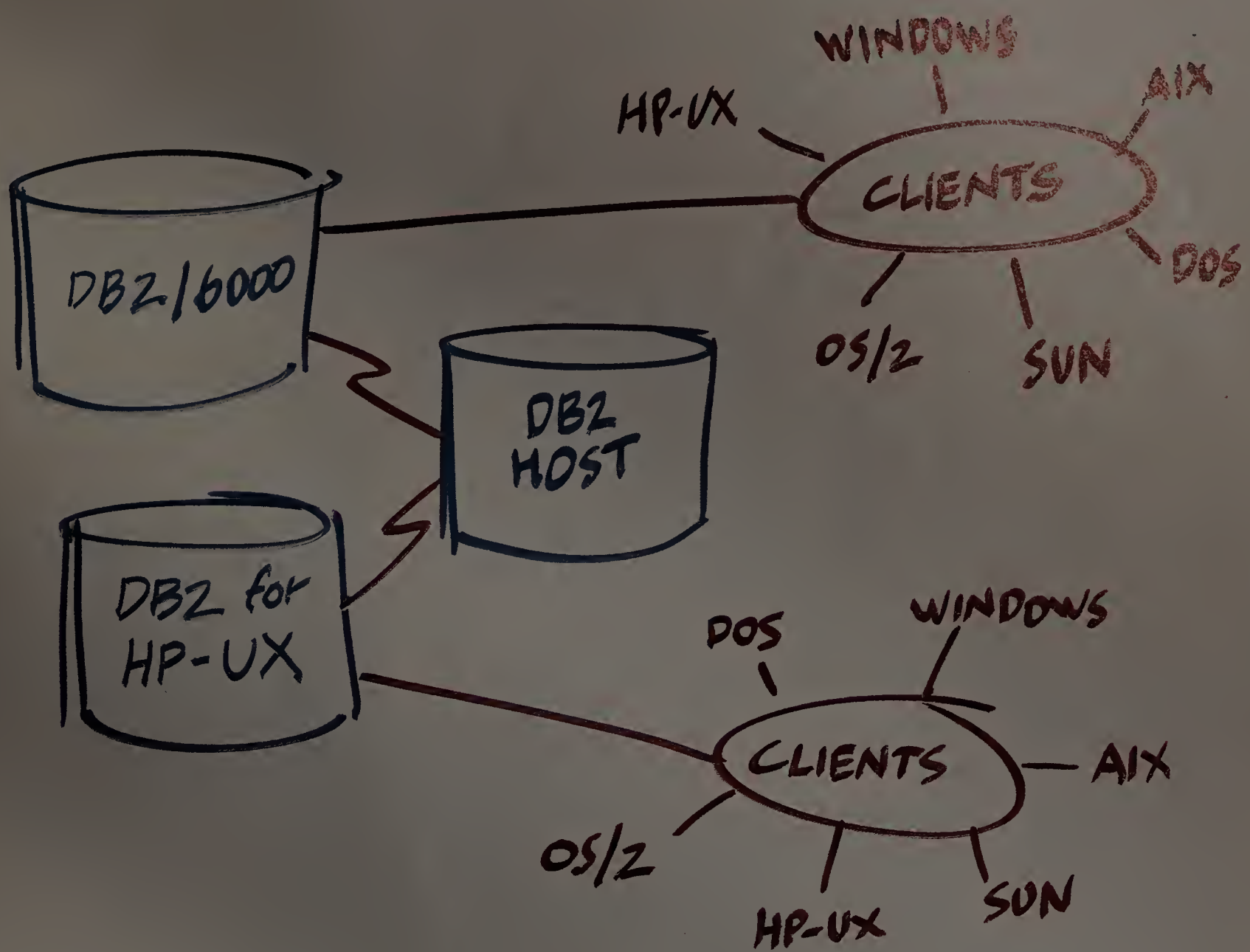
Paying for the privilege

Computer Associates didn't get to be the world's second-richest software company by spending money willy-nilly, even if it is Christmas. Indeed, a holiday greeting card arrived at *Computerworld*'s California bureau from CA with 10 cents postage due. And a very merry to you, too, Charlie Wang.

Diving for dollars

When informed that a Cabletron salesman had jumped out of an airplane to beat SynOptics out of a contract (see story page 10), a Bay Networks insider said, "Wow, that's creative." Upon reflection, he added, "I wish everyone in the company would jump out of an airplane. I'd even charter the flight." Reckon the two companies didn't exchange Christmas cards, eh?

The press materials we get can yield interesting bounty. One recent pearl: a fax from a mainframe customer heralding plans to implement "a mullet-faced computing environment." Now that smells like a multifaceted paradigm that won't attract many imitators. If you have a line on something fishy, hook Computerworld *by calling our 24-hour voice-mail tip line at (508) 820-8555 or (800) 343-6474. News editor Maryfran Johnson can be reached by phone at (508) 820-8179, via the Internet at mjohnson@cw.com or through MCI Mail at 590-8017.*



DB2 goes UNIX, UNIX, UNIX.

How do you move your data safely between the mainframe and client/server UNIX® environments? No matter what flavor of UNIX you choose, the answer is DB2.®

DB2 for HP-UX,™ DB2 for the Solaris® Operating Environment, and DB2 AIX/6000™ provide transparent access to host databases from servers and LAN client applications (including DOS, Windows™ and OS/2®) via DDCS (Distributed Data Connection Services). Support for the X/Open® XA interface specification for efficient transaction management is built in. Stored procedures distribute application workloads between clients and servers while referential integrity, multi-level concurrency support, forward recovery and online backup ensure high performance and availability. And each DB2 open solution protects your existing investment by allowing you to manage your corporate data securely within your client/server environment. Installation and client configuration are easy.

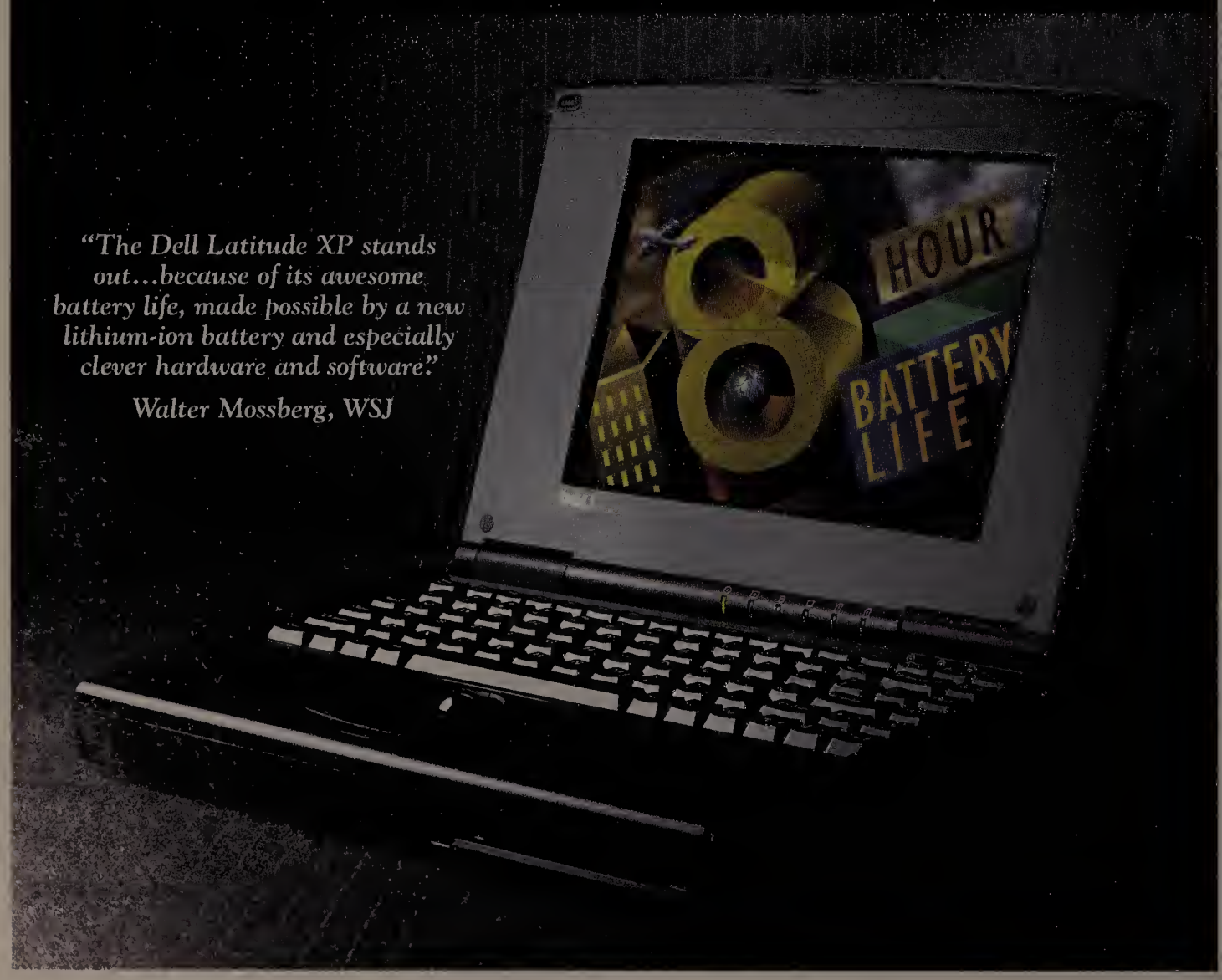
DB2 has never been more open. For more information about these and other DB2 solutions, **call 1 800 IBM-3333, ext. STAR 718,** or contact your authorized IBM reseller.

SOFTWARE FOR
CLIENT/SERVER RDBMS



Portugal (351.1.7915111), Saudi Arabia (966.2.6600007), S. Africa (27.11.2219111), Spain (900.100.400), Sweden (08.793.4004), Switzerland (155.4646), Turkey (90.212.2809000), UK (0329.242728). IBM, DB2, OS/2 and AIX are registered trademarks and AIX
Corporation. Solaris and Sun are registered trademarks of Sun Microsystems, Inc. UNIX is a registered trademark of UNIX System Laboratories, Inc. X/Open is a registered trademark of X/Open Company, Ltd. HP-UX is a trademark of Hewlett-Packard Co. Windows

LET'S JUST SAY THE AIRPLANE WILL BEGIN ITS DESCENT FIRST.



"The Dell Latitude XP stands out...because of its awesome battery life, made possible by a new lithium-ion battery and especially clever hardware and software."

Walter Mossberg, WSJ

HOW DELL GIVES YOU TRUE EIGHT-HOUR BATTERY LIFE[Δ]

The Dell® Latitude XP™ notebook's lithium ion battery packs more juice into the same space as older batteries.

Our exclusive power management software is designed to dynamically adjust energy consumption.

Dell's engineering expertise combines the lithium ion battery with power management software to give you higher performance without sacrificing battery life.

([Δ]Actual battery life will vary depending on nature and frequency of use and configuration.)

DELL LATITUDE XP
IntelDX4™ 100MHz System

9.5" Dual Scan Color Display

8MB RAM (36MB Max RAM)

340MB Removable Hard Drive
(810MB Hard Drive also available. Call for special prices.)

New Smart Lithium Ion Battery

PC Card Slots: 2 Type II or 1 Type III

Optional Advanced Port Replicator with Built-in Ethernet and SCSI

3-year Warranty[†]

30-day Money-back Guarantee[†]

$3499*

Business Lease[◊]: $129/MO.
Order Code #600025

When your captain tells you he's beginning the final approach, your Dell Latitude XP notebook is far from being finished. All thanks to its unrivaled eight hours of battery life.[Δ]

That means you can power up on one coast and work non-stop as you fly across the country. And if that's not tempting enough, we even offer a 100MHz Latitude XP for $3499.

So, call today to order Latitude XP notebooks for your company. But do realize that even with these extra hours of juice, you still have to cooperate when the flight attendant asks you to put your tray in the upright position.

intel inside

DELL®

(800) 666-1160 MONDAY-FRIDAY 7AM-9PM CT • SATURDAY 10AM-6PM CT • SUNDAY 12PM-5PM CT
KEYCODE #12008 • CANADA* CALL 800-387-5755 • MEXICO CITY* CALL 800-228-7811

*Guarantees available in the U.S. only for registered owners of Dell Latitude Series systems purchased after 8/8/94. For a complete copy of our Guarantees or Limited Warranties, please call our TechFax℠ line at 1-800-950-1329, or write Dell Computer Corporation, 2240 W. Braker Lane, Building 3, Austin, TX 78758. * Non-discountable promotional price expires 1/31/95. Prices valid in the U.S. only. Some products and promotions may not be available outside the U.S. Prices and specifications subject to change without notice. Walter Mossberg quote from the Wall Street Journal, 9/9/94, ©1994 Dow Jones and Company, Inc., all rights reserved. Business leasing arranged by Leasing Group, Inc. The Intel Inside logo is a registered trademark and IntelDX4 is a trademark of Intel Corporation. Dell disclaims proprietary interest in the marks and names of others. ©1994 Dell Computer Corporation. All rights reserved.*